

Fed Fac Docket: Silver Creek Tailings (UTD980951404)  
Dates: 01/85 - 11/26/85

  
1112367 - R8 SDMS

SILVER CREEK TAILINGS  
PARK CANYON, UT.  
(NPL DOCKET)

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## ecology and environment, inc.

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International Specialists in the Environmental Sciences

TO : FILE  
FROM : Jeff Holcomb *Jeff Holcomb*  
DATE : May 6, 1985  
SUBJECT: Park City Municipal Water Supply.

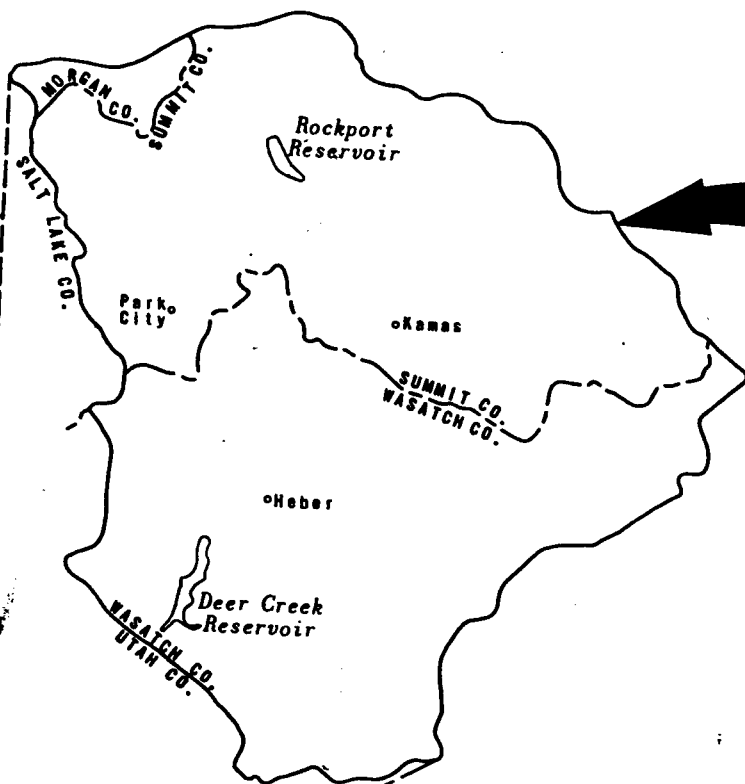
Summary of the phone conversation with Jerry Gibbs, Director of Public Works for Park City, Utah, about the location of the water supplies for Park City.

1. Judge Tunnel - located in Empire Canyon at the south end of town.
2. Spiro Tunnel - located in Thaynes canyon east of town.
3. Thirot Spring - located 400 yards north of Spiro Tunnel.
4. Park Meadow Well - located approximately 650 yards east of Hwy 224 and 1/2 mile north of Hwy 248.

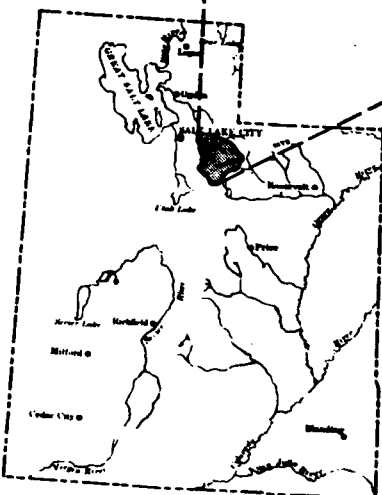
All residents within the Park City city limits are required to be hooked into the supply.

Uses of ground water are: drinking, culinary, and irrigation.

# WATER RESOURCES OF THE HEBER-KAMAS-PARK CITY AREA NORTH-CENTRAL UTAH



**HEBER-KAMAS-  
PARK CITY AREA**



**UTAH**

**Technical Publication No. 27  
State of Utah  
DEPARTMENT OF NATURAL RESOURCES  
1970**

**STATE OF UTAH  
DEPARTMENT OF NATURAL RESOURCES**

**Technical Publication No. 27**



**WATER RESOURCES OF THE HEBER-KAMAS-PARK CITY AREA  
NORTH-CENTRAL UTAH**


by  
C. H. Baker, Jr.  
Hydrologist, U. S. Geological Survey

With a section on  
**A GRAVITY AND AEROMAGNETIC SURVEY OF  
HEBER AND RHODES VALLEYS**

by  
D. L. Peterson  
Geologist, U. S. Geological Survey

Prepared by the U. S. Geological Survey  
In cooperation with  
The Utah Department of Natural Resources  
Division of Water Rights

1970



per year. The difference, an average of 1,600 acre-feet per year, plus any diversions from Beaver Creek, is the conveyance loss of the canal.

The discharge of Beaver Creek is not measured, but the creek enters the Weber River between the stations near Oakley (site 2, fig. 5) and near Peoa (site 4, fig. 5). No other perennial tributaries enter this reach of the river, although the Weber-Provo diversion is taken out: the difference in average discharge at the two stations, adjusted for the canal diversion, should therefore approximate the average discharge of Beaver Creek. Although the average discharge of the Weber River near Oakley for the entire long period of record is 159,300 acre-feet per year, the discharge near Oakley for the period of record available near Peoa is smaller—about 139,000 acre-feet per year. The Weber-Provo Canal diversion (average for the period 50,600 acre-feet per year) is removed from the river below this station, leaving about 88,500 acre-feet per year as the discharge of the main river above the gaging site near Peoa. The average discharge at the station near Peoa, however, is 107,100 acre-feet per year; the river gains 18,600 acre-feet per year (average) between the two stations. Some of the gain is undoubtedly ground-water discharge from the unconsolidated deposits in Rhodes Valley, but most of the gain is the discharge of Beaver Creek; an arbitrary estimate of the contribution from Beaver Creek is about 17,000 acre-feet per year.

The gaging station on East Canyon Creek is many miles downstream from the area of this study; less than half the drainage area of the creek above the gaging station is in the study area. It is probable, therefore, that the average discharge of East Canyon Creek from the study area does not exceed 15,000 acre-feet per year.

#### Chemical quality

All surface water from the Weber River drainage basin that was analyzed was chemically suitable for domestic, stock, and irrigation use. Chemical analyses of seven samples of surface water from the Weber River drainage basin are reported in table 5. All the samples are dilute calcium bicarbonate type water. The most concentrated of the seven samples (445 mg/l) was from Silver Creek at the old Silver King Mine near Park City. The stream at that point almost certainly included ground water discharging from the mine tunnels, which is more concentrated than most surface water in the area.

## GROUND-WATER HYDROLOGY

### Ground water in the consolidated rocks

The consolidated rocks in the Heber-Kamas-Park City area are an important element in the total ground-water system of the area. Springs and wells that discharge water from the consolidated rocks are the principal source of supply for water users in the mountains. Moreover, much of the water that enters the rocks in the mountains either reappears as springs along the margins of the valleys or moves into the unconsolidated valley fill as recharge in the subsurface.

### Water-bearing units

The consolidated rocks underlying the Heber-Kamas-Park City area range in age from Precambrian to Quaternary. A generalized stratigraphic summary of the consolidated rocks is

given in table 1. This is a composite section and nowhere in the area are all the formations present. Plate 2 is a geologic map showing the areal distribution of the various rock units.

The rocks in both the Wasatch Range and the Uinta Mountains have been subjected to considerable deformation and are greatly fractured, faulted, and folded. The most prominent displacement in the area is the Charleston thrust fault, which crosses the south end of Heber Valley. Several smaller thrust faults have been mapped, and high-angle faults of small displacement are numerous. Joints and fractures are ubiquitous, and solution openings are common in the carbonate rocks. These openings and the faults play a major role in controlling the movement of ground water in the area. Small folds are abundantly present, but they exert little influence on ground-water movement.

Water moves through the rocks along the abundant fractures, solution openings, and fault planes, and thus any formation may be, at least locally, water bearing. In his report on the Park City Mining District, Boutwell (1912, p. 24) observed that the water in the mines came principally from "the red shale and massive quartzite" (Woodside Formation and Weber Quartzite). Officials of the United Park City Mining Co. agree that most of the water in that company's workings appears in tunnels that penetrate the Weber Quartzite (J. Ivers, Jr., oral commun., 1967).

In 1967, the few wells in the project area that were finished in the consolidated rocks derived their water from only 11 of the more than 30 geologic units under the area. The producing formations were the Quaternary tufa deposits, the Tertiary volcanic rocks, the Knight Conglomerate, the Preuss Sandstone, the Twin Creek Limestone, the Nugget Sandstone, the Chinle Formation, the Ankareh Formation, the Thaynes Formation, the Oquirrh Formation, and the Weber Quartzite. Other units, especially the carbonate rocks of Pennsylvanian, Mississippian, and Devonian age, yield water to springs in the area, and Feltis (1966, p. 14-17) states that in the Uinta Basin, southeast of the study area, some water is obtained from the Park City Formation of Permian age and from the Uinta Formation of Tertiary age. More wells in the study area obtain water from the Tertiary volcanic rocks than from any of the other formations, probably because the volcanic rocks are the shallowest consolidated rocks in the areas where most of the bedrock wells are located.

#### Aquifer characteristics

In a broad way, for the purpose of evaluating areal movement of ground water, the highly fractured rocks of the Wasatch Range can be regarded as a single homogeneous aquifer, and the same is probably true of the rocks in the Uinta Mountains. On the small scale involved in selecting sites for the development of water supplies, however, the aquifers are grossly heterogeneous. Information from drillers' tests of wells finished in the consolidated rocks shows that the development of supplies of water sufficient for irrigation, industrial needs, or public supplies from the consolidated rocks depends upon the wells intersecting water-bearing fractures. Even in a fracture system that is properly described as "closely spaced," however, the distance between adjacent fractures may be very large compared to the diameter of a well. Hence, the construction of wells to intercept water moving through fractured rocks tends to be a "hit-or-miss" affair. The large discharge of water from mine tunnels near Park City should not be taken as an indication of the potential yield of wells. Each tunnel drains many miles of workings, whereas a well usually drains a relatively small area. Small supplies, adequate for domestic use in single-family dwellings, can probably be obtained from several of the consolidated rock units.

Drillers' reports of a few wells (table 3) include the results of pumping tests, generally of only a few hours duration. The test results were evaluated by the method of Theis and others (1963) to derive the values of aquifer transmissivity included in table 1.

Table 1.—Generalized stratigraphic summary of the consolidated rocks of the Heber-Kamas-Park City area

Age	Formation	Lithology and thickness	Water-bearing properties
Quaternary	Tufa deposits	Calcareous tufa deposited from the water of thermal springs. Nearly pure calcium carbonate. Very porous. Thickness unknown, but locally exceeds 70 feet.	Yields some water to wells. Numerous warm springs flow from tufa deposits, but source of water is probably underlying beds. Tufa apparently is permeable and transmits water readily.
Tertiary	Extrusive igneous rocks	Chiefly andesitic pyroclastics with some intercalated flow rocks. Includes Keatley Volcanics and Tibble Formation. Thickness uncertain, but reportedly may exceed 1,000 feet.	Yields some water to wells, chiefly in the Parleys Park area, and to numerous small springs. Most of the observed springs are along fractures or contacts. Transmissivity estimated from drillers' reports as about 270 ft <sup>3</sup> /d/ft.
	Intrusive igneous rocks	Includes a few small bodies of basic rocks in the Uinta Mountains and many large masses of granitic rocks in the Wasatch Range. Thickness unknown.	Intrusive rocks yield some water to mine tunnels from fractures, but have little significance as aquifers in the area.
	Fowkes Formation	Tuffaceous and limy beds and local conglomeratic lenses. Thickness and stratigraphic relations uncertain. Present only in extreme northwestern part of the study area.	Not known to yield water in the study area.
	Uinta Formation	Fluvial and lake deposits. Present only in the extreme south end of the study area. Thickness in the area unknown.	Not known to yield water in the study area, but reportedly supplies some wells locally in the Uinta Basin to the south-east (Feltis, 1966).
	Knight Conglomerate	Gray and reddish conglomerate in massive beds, chiefly fluvial. Thickness as much as 2,000 feet.	Yields water to a few wells in the northern part of the study area. Transmissivity probably less than 135 ft <sup>3</sup> /d/ft.
Tertiary and Cretaceous	Wanship Formation of Eardley (1952)	Marine sandstone and shale. Thickness as much as 5,000 feet.	Not known to yield water in the study area.
Cretaceous	Echo Canyon Conglomerate of Eardley (1944)	Conglomerate and conglomeratic sandstone and some shale and a few coal beds. Thickness at least 3,100 feet.	Not penetrated by wells in the study area, but supplies a few springs.
	Frontier Formation	Nonmarine and marine sandstone, shale, and coal. Thickness more than 2,100 feet.	Not penetrated by wells in the study area. Probable source of a few small springs.
	Price River Formation	Conglomerate and shale. Thickness as much as 1,500 feet, but probably less in the study area. Present only in the extreme south end of the area.	Not known to yield water in the study area.
	Aspen Shale	Dark gray marine shale. Thickness about 250 feet.	Do.
	Kelvin Formation	Continental deposits, predominantly red colored. Thickness about 1,500 feet.	Not penetrated by wells in the study area, but supplies a few springs.
Jurassic	Morrison Formation	Continental deposits, locally containing abundant dinosaur remains. Thickness uncertain, perhaps as much as 1,200 feet.	Not known to yield water in the study area.
	Freuss Sandstone	Nonmarine siltstone and sandstone. Thickness probably more than 1,000 feet.	Yields small amounts of water to a few wells in the area. Insufficient data to estimate transmissivity.
	Twin Creek Limestone	Light-colored splintery limestone. Thickness as much as 2,000 feet.	Yields water to several wells and springs in the area, probably from fractures and solution cavities. Data suggest transmissivity of less than 135 ft <sup>3</sup> /d/ft.
Jurassic(?) and Triassic(?)	Nugget Sandstone	Crossbedded eolian sandstone, generally some shade of red. Thickness as much as 1,200 feet.	Yields water to several wells in the area. Transmissivity generally low (about 65 ft <sup>3</sup> /d/ft) but locally as high as 335 ft <sup>3</sup> /d/ft.
Triassic	Chinle Formation	Mixed nonmarine sediments, generally red. Thickness uncertain, probably less than 500 feet.	Yields small amounts of water to wells in the Parleys Park area. Transmissivity probably less than 135 ft <sup>3</sup> /d/ft.
	Shinarump Member of the Chinle Formation	Fluvial sandstone and conglomerate. Thickness about 100 feet in the study area.	Not known to yield water in the study area.
	Ankareh Formation	Chiefly red siltstone, sandstone, and shale. Thickness more than 1,000 feet.	Yields a little water to wells in the Parleys Park area from sandy beds. Insufficient data to estimate transmissivity.
	Thaynes Formation	Calcareous marine sediments. Thickness more than 2,000 feet.	Yields some water to a few wells and springs, largely from fractures and solution openings. Insufficient data to estimate transmissivity.
	Woodside Formation	Red siltstone, sandstone, and shale. Thickness about 500 feet.	Reportedly yields water to the mine tunnels in the Park City area from fractures.
Permian	Park City Formation	Limestone, phosphorite, cherty siltstone, and shale. Thickness about 1,500 feet.	Not tapped by wells in the study area, but reportedly yields some water in the Uinta Basin (Feltis, 1966).
	Diamond Creek Sandstone	Light-colored crossbedded sandstone. Thickness up to 1,000 feet. Present only in the extreme south end of the study area.	Neither of these two formations is sufficiently extensive in the study area to be important as aquifers. No wells in the area tap either formation, but a few small springs in the extreme south end of the area produce water from one or both of these formations.
	Kirkman Limestone	Dark-colored, brecciated, thin-bedded limestone. Thickness up to 1,600 feet. Present only in the extreme south end of the study area.	
Permian and Pennsylvanian	Oquirrh Formation	Interbedded sandstone and limestone containing some shale and siltstone. Thickness as much as 8,000 feet, but probably less in the study area. Present only south of Heber City.	Yields some water to wells and springs, chiefly from fractures and solution openings. Transmissivity estimated as about 270 ft <sup>3</sup> /d/ft.

Table 1.—Generalized stratigraphic summary of the consolidated rocks of the Heber-Kamas-Park City area—continued

Age	Formation	Lithology and thickness	Water-bearing properties
Pennsylvanian	Weber Quartzite	Chiefly gray crossbedded sandstone. Thickness up to 3,000 feet.	Yields small amounts of water to a few wells. Primary permeability is very low, but reportedly yields large quantities of water from fractures in the mine workings near Park City. Principal source of water in the mines.
	Morgan Formation	Red sandstone and shale interfingers with the Weber Quartzite in part. Thickness up to 1,000 feet.	No information on water-bearing properties in the study area, but primary permeability is probably low.
	Round Valley Limestone	Light-gray marine limestone. Thickness 250-400 feet.	No wells penetrate the formation in the study area, but it yields water to numerous springs.
Pennsylvanian and Mississippian	Manning Canyon Shale	Marine shale, siltstone, claystone, and limestone. Thickness 300-500 feet.	Not penetrated by wells in the area, but supplies a few small springs.
Mississippian and Devonian	Mississippian and Devonian rocks undivided	Chiefly marine limestones and dolomites. Thickness from 3,000 to 6,000 feet.	Not penetrated by wells in the area, but yields water from fractures and solution openings to many springs. A major aquifer.
Cambrian	Cambrian sedimentary rocks undivided	Chiefly shales and quartzites. Thickness uncertain, probably up to 3,000 feet.	Not known to yield water in the study area.
Precambrian	Precambrian rocks undivided	Chiefly metasediments. Thickness unknown.	Water-bearing potential unknown, but probably small.

#### Recharge

In most of the mountainous area, the soil cover is thin and permeable, and rain or snowmelt can infiltrate readily. The rapidity of infiltration into the rocks in the mountains is indicated by the reports that the discharge of the mine tunnels in the Park City area increases noticeably during the period of spring snowmelt and runoff. Moreover, observation well (D-2-5)32bad-1, finished in the Tertiary volcanic rocks, shows small rises of water level only a few hours after a rainstorm over the area. The water level in one of the nonflowing thermal springs near Midway (see p. 21) also rises rapidly in response to rain or snowmelt in the mountains.

#### Movement

As has been indicated, water moves through the consolidated rocks readily, principally along the abundant zones of fracturing and solution openings. The direction of movement is, in general, downhill from recharge areas in the mountains to discharge areas near the margins of the valleys.

Whether any appreciable amount of water leaves the study area through the consolidated rocks is difficult to ascertain, but an unbalance of 17,000 acre-feet per year in the ground-water budget for Heber Valley is probably due to movement out of the valley through the consolidated rocks. The structural feature most commonly suspected of draining water from the area is the Charleston thrust fault, which passes entirely through the Wasatch Range. Deer Creek Reservoir, on the Provo River, lies directly across the outcrop of the Charleston and associated Deer Creek thrust fault (see pl. 2), and the water budget for Deer Creek Reservoir (see p. 8) indicates that there is no loss of water from the reservoir along the thrust planes. Because there is no detectable movement of water from Deer Creek Reservoir down the Charleston thrust fault, it is probable that no significant amount of ground water leaves the study area along the fault.

## Discharge

The principal manmade discharge of water from the consolidated rocks in the area is through the extensive mine workings in the vicinity of Park City (fig. 7). The amount of water discharged by the few small-capacity wells that penetrate the consolidated rocks is only a very small part of the total discharge. Natural discharge is through numerous springs, mostly around the margins of the valleys, and through direct infiltration into the unconsolidated deposits in the valleys.

The total discharge from mine tunnels is estimated as at least 50 cfs (cubic feet per second) or 36,000 acre-feet per year. The discharge of the Spiro Tunnel, near Park City, was reported in 1935 as about 15 cfs and "a rather steady flow" for several years (G. H. Taylor, written commun., 1935). The flow of Drain Tunnel Creek, which consists principally of the discharge of the Ontario No. 2 Drain Tunnel, is measured at a weir about 5 miles downstream from the mouth of the tunnel (fig. 2). The losses to evapotranspiration between the tunnel mouth and the weir probably equal or exceed any gains from ground-water discharge to the stream. The average discharge of Drain Tunnel Creek is 15.9 cfs (18 years of record). The drainage from the Mayflower Mine enters Drain Tunnel Creek downstream from the above-mentioned weir; in 1967-68 the discharge of the Mayflower Mine drainage was estimated as about one-half that of Drain Tunnel Creek at the weir. Smaller amounts of water are discharged from other tunnels in the area.

The water discharged from the Alliance Tunnel (quantity unknown) provides the municipal supply for Park City; the discharge from the other tunnels is used for irrigation in Parleys Park and Heber Valley.

A large but undetermined amount of water is discharged from the consolidated rocks through numerous springs. In 1968, the Utah State Engineer's records included claims to water from about 250 springs that discharge water from the consolidated rocks. The springs are nearly all associated with fractures or solution openings. The largest springs in the area flow from solution openings in the limestones of Pennsylvanian and Mississippian age. For example, three springs near the mouth of Snake Creek Canyon discharged about 13 cfs from the limestones during the summer of 1967.

An unusual hydrologic feature of Heber Valley is a group of thermal springs near the town of Midway. Although the springs are located on the Snake Creek alluvial fan, and are underlain in part by alluvium, their source is deep seated and they represent discharge from the consolidated rocks. A more detailed discussion of the thermal springs has been given elsewhere (Baker, 1968), and they will be described only briefly here.

Most of the thermal springs do not flow and are known locally as "hot pots." The typical hot pots are small pools of warm water that occupy shallow depressions in the tops of mounds of calcareous tufa (fig. 8). Seventeen hot pots in the area have been examined by the writer. Four of the hot pots are artificially discharged to supply water to swimming pools at resorts, 2 pots occasionally overflow, and the other 11 discharge water at the land surface only by evaporation, although some thermal water may be discharged into the valley fill in the subsurface.

The temperature of the water in the 13 pots without artificial discharge ranges from 12° to 34°C (54°-94°F), and the highest temperatures are in the 2 pots that occasionally overflow. Water temperature in the 4 pots that are artificially discharge ranges from 38° to 40°C (100°-104°F). Addition of heated water from below to many of the pots is very slow, and the water of a few pots is lower than that properly classified as "thermal."

In addition to the hot pots, at least 7 thermal springs in the area flow perennially. The discharge of these springs ranges from a few gallons per minute to about 3 cfs; the total discharge of the 7 springs in 1967 was about 7 cfs. The water temperature of the 7 flowing springs ranges from 30° to 46°C (86°-144°F).

#### Chemical quality

Nearly all the nonthermal water from the consolidated rocks is suitable for domestic use according to the standards of the U. S. Public Health Service (1962); the exception is some water from the volcanic rocks that is high in iron. All the water is hard to very hard, and many residents of the area use ion-exchange type softeners in their domestic water systems. Water from the hot pots is too mineralized to be desirable for domestic use, and plentiful supplies of better water are available from the springs that furnish the public supply of Midway. Even water from the hot pots is used by livestock; and, according to the criteria established by the U. S. Department of Agriculture (U.S. Salinity Lab. Staff, 1954), all water from the consolidated rocks in the area is suitable to use for irrigation. Although water from the hot pots is in the high salinity hazard class for irrigation, it can be used for salt-tolerant crops on the permeable and well-drained soils in Heber Valley.

Samples of water for chemical analysis were collected from 28 springs, wells, and tunnels that tap the consolidated rocks; the analyses are included in table 5. The locations from which the samples were collected and diagrammatic representations of the concentrations of the principal dissolved solids in some of the samples are shown on plate 3. Four kinds of water can be distinguished from four general sources in the consolidated rocks. Figure 9 illustrates average analyses of samples of the four kinds of water.

Water from the sandstones and limestones of Jurassic age and older is represented by diagram 1 (fig. 9). The water is of calcium magnesium bicarbonate type and is not highly mineralized; the concentration of dissolved solids in 13 samples from these formations ranged from 104 to 488 mg/l. Most samples were hard according to the classification of the U. S. Geological Survey (more than 120 mg/l hardness), and many samples were in the very hard range (more than 180 mg/l). The concentration of silica was low; the samples ranged from 8.2 to 25 mg/l, but most were below 20 mg/l. The percentages of sulfate and chloride were low (each less than 20 percent of the total anions), and chloride was generally slightly lower than sulfate.

Diagram 2 (fig. 9) is typical of water from the shales of Triassic age; 1 sample was collected from a spring, 1 from a well, and 3 from mine drain tunnels. The water is of calcium sulfate type, and generally more concentrated than that from the limestones and sandstones. The concentration of dissolved solids in 5 samples ranged from 218 to 691 mg/l. All samples were in the very hard range; the hardness of 2 samples exceeded 300 mg/l. Concentrations of silica ranged from 6.3 to 21 mg/l.

Water from the volcanic rocks is represented by diagram 3 (fig. 9). The volcanic rocks yield calcium bicarbonate type water; the concentrations of 5 samples ranged from 249 to 1,020 mg/l. Four samples were in the very hard range, but water from the volcanic rocks was generally softer than water from the shales. Concentrations of silica were much higher in these samples than in water from other sources in the area. The silica concentration ranged from 22 to 52 mg/l, but only 1 sample was below 30 mg/l. The relative concentrations of sulfate and chloride in these waters was also distinctive; the samples contained from 3 to 5 times as much chloride as sulfate. The volcanic rocks are the only consolidated rocks in the area that yield water containing

substantially more chloride than sulfate. One sample was very high in iron (34 mg/l) but this seems to be a local condition; the few other analyses indicate little or no iron in solution.

Water from the hot pots is a calcium sulfate bicarbonate type (diagram 4, fig. 9), and is by far the most mineralized water in the area. Concentrations of dissolved solids in 10 samples of the thermal water ranged from 1,650 to 2,160 mg/l, and total hardness ranged from 960 to 1,270 mg/l. The water is saturated with respect to calcium carbonate at normal temperatures and pressures; calcium carbonate precipitates from samples that are allowed to stand for a few days exposed to the atmosphere.

#### Ground water in the unconsolidated deposits

The principal source of water to wells in the Heber-Kamas-Park City area is the unconsolidated alluvial fill in the major valleys. Unconsolidated deposits in the mountains have little significance as aquifers. The stratigraphy, lithology, and water-bearing characteristics of the unconsolidated deposits are summarized in table 2. The areal distribution of the various units is shown on plate 2.

Table 2.—Generalized description of the unconsolidated deposits in the Heber-Kamas-Park City area

Age	Unit	Lithology and thickness	Water-bearing properties
Quaternary	Younger alluvium	Poorly sorted mixture of material ranging in size from clay to boulders. All beds appear to be lenticular and discontinuous. Thickness ranges from 0 to about 1,000 feet. Underlies the valley floors of Heber Valley, Rhodes Valley, Parleys Park, and Round Valley and forms low terraces along the margins of Heber and Rhodes Valleys. The two units cannot be distinguished lithologically; the terraces are mapped as older alluvium and the valley floors as younger alluvium, but older alluvium probably also underlies the valley floors.	These deposits form the best and most productive aquifers in the study area. Water-table conditions predominate. Hydraulic conductivity ranges from 20 to 50 ft <sup>3</sup> /d/ft <sup>2</sup> ; estimated specific yield ranges from 12 to 15 percent. Most wells and many springs in the study area yield water from these deposits.
	Older alluvium		
	Landslide deposits	Unsorted material ranging from clay through boulders. Thickness unknown. Present only in a few isolated areas of the mountains.	Hydrologic properties unknown, but the scattered small deposits have no hydrologic significance in the area.
	Glacial deposits	Includes outwash deposits, moraine deposits, and glacially striated bare ground. Present in the higher elevations of both the Wasatch Range and the Uinta Mountains.	The small areas of sorted outwash undoubtedly store and transmit some ground water, but the glacial deposits as a whole have no significance as aquifers in the study area.
Tertiary (?)	Older high-level gravel surfaces of uncertain age	Planed surfaces underlain by thin deposits of gravel. Thickness uncertain. Present only in southeastern part of study area.	No data concerning hydrologic characteristics, but not significant as an aquifer in the study area.

#### Heber Valley

Heber Valley, on the Provo River, is the largest of the four valleys included in the study area (pl. 1 and fig. 1). The valley floor is roughly triangular in plan and has an area of about 44 square miles. The Provo River enters the valley at the northern apex of the triangle and flows out near the southwestern apex. Three small tributaries of the Provo River—Lake, Center, and Daniels Creeks—enter the valley near the southeastern apex, and a fourth tributary, Snake Creek, enters about midway on the western side of the valley. The valley floor is thickly blanketed with unconsolidated debris, and each of the tributary streams has built a substantial alluvial fan at the mouth of its canyon.

Two wells in Heber Valley that pass through the entire thickness of unconsolidated material reached consolidated rocks at depths of about 310 feet. Geophysical studies, however,



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

NPL. 04-3-132

NOV 25 1985

MEMORANDUM

OFFICE OF  
SOLID WASTE AND EMERGENCY RESPONSE

SUBJECT: Meeting with Congressman Neilson Regarding  
Creek Mining, Utah site

FROM: C. Scott Parrish, Chief *C. Parrish*  
NPL Section

TO: The Record

**RECEIVED**  
DEC 4 1985

Superfund  
Remedial Branch

On November 18, Henry Longest, Elaine Stanley, Hal Snyder, Ellen Siegler, and Scott Parrish met with Congressman Nielson; representatives from Senator Garn's office, and Senator Hatch's office; representatives of Park City, Utah; and representatives from the Utah State Department of Health (USDH) to discuss the NPL process and the status of the Silver Creek Mining site.

The attorney from Park City explained the conditions of the site and complained about the technical basis of the Hazard Ranking System (HRS). Specifically, he stated that telephone calls to document the HRS score were placed to uninformed persons and questions were misleading. The attorney stated that independent of this meeting, the city has provided EPA with formal comments on the proposal.

Congressman Nielson stated that he is not recommending that the site be taken off the NPL, rather, the correct actions should be implemented to protect the public health and welfare.

The representative from the USDH stated that she supported the position of the Park City officials and recommended that EPA complete further studies prior to listing.

Representatives from the offices of Senator Garn and Senator Hatch stated that EPA should evaluate the facts and take appropriate action.

Mr. Longest explained the PA/SI/NPL process and emphasized that EPA has developed a policy of conducting a comprehensive RI/FS following listing, not as precondition to listing.

The Park City attorney questioned why the NPL site is considered a threat, when a similar tailings pile located nearby, discharges nearly twice the concentration of contaminants, yet the discharge is permitted under NPDES. Mr. Longest explained that the NPDES permit is issued with respect to a point discharge of a treated effluent. This situation is different than the NPL candidate.

Representatives from Park City asked what is the timeframe for final rulemaking and potentially responsible party search. Mr. Longest said we did not have an answer at this time.

Finally, the representatives from Park City stated that they wanted a response to their comment on the Agency's alleged failure to consider the impact of rulemaking on Park City. Mr. Longest stated that EPA would review the comments and provide an appropriate response.



1/30/86

NPI-04-3-213

Legal Department

January 20, 1986

Mr. Henry Longest  
Division Director  
Environmental Protection Agency  
401 M Street S.W.  
Washington, D.C. 20050

RE: Silver Creek Tailings Site/Park City, Utah

Dear Mr. Longest:

Park City officials recently met with a gentlemen named Eric Engleman who works for one of the EPA consulting firms. Mr. Engleman was from Massachusetts and informed us that he had been sent to Park City for the purpose of preparing a "proposed responsible parties list" for the Silver Creek Tailings Site.

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I have a very difficult time understanding why EPA could not hire a local contractor to perform this work at the appropriate time. It seems totally unreasonable for Federal

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I request that a copy of this letter be placed in the official docket on the Silver Creek Tailings Site and made a part of the record.

Sincerely,

Thomas E. Clyde  
City Attorney

cc: Congressman Howard Nielson  
Robert Duprey  
Docket Clerk



4/30/86

NPI-04-3-213

Legal Department

January 20, 1986

Mr. Henry Longest  
Division Director  
Environmental Protection Agency  
401 M Street S.W.  
Washington, D.C. 20050

RECEIVED  
FEB 4 1986

Superfund  
Remedial Branch

RE: Silver Creek Tailings Site/Park City, Utah

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Robert Duprey  
Docket Clerk



4/30/86

NPL-04-3-413

Legal Department

January 20, 1986

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Division Director  
Environmental Protection Agency  
401 M Street S.W.  
Washington, D.C. 20050

RECEIVED  
FEB 4 1986

Superfund  
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Docket Clerk



1/30/86

NPI-04-3-L13

Legal Department

January 20, 1986

Mr. Henry Longest  
Division Director  
Environmental Protection Agency  
401 M Street S.W.  
Washington, D.C. 20050

RECEIVED  
FEB 4 1986

Superfund  
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1/30/86

NPL-04-3-413

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Robert Duprey  
Docket Clerk



## ecology and environment, inc.

4105 EAST FLORIDA AVENUE, SUITE 350, DENVER, COLORADO 80222, TEL. 303-757-4984

International Specialists in the Environmental Sciences

TO : FILE  
FROM : Jeff Holcomb *Jeff Holcomb*  
DATE : May 6, 1985  
SUBJECT: Park City Municipal Water Supply.

Summary of the phone conversation with Jerry Gibbs, Director of Public Works for Park City, Utah, about the location of the water supplies for Park City.

1. Judge Tunnel - located in Empire Canyon at the south end of town.
2. Spiro Tunnel - located in Thaynes canyon <sup>west</sup> ~~east~~ of town.
3. Thirot Spring - located 400 yards north of Spiro Tunnel.
4. Park Meadow Well - located approximately 650 yards east of Hwy 224 and 1/2 mile north of Hwy 248.

All residents within the Park City city limits are required to be hooked into the supply.

Uses of ground water are: drinking, culinary, and irrigation.

<b>RECORD OF COMMUNICATION</b>	<input checked="" type="checkbox"/> PHONE CALL <input type="checkbox"/> DISCUSSION <input type="checkbox"/> FIELD TRIP <input type="checkbox"/> CONFERENCE <input type="checkbox"/> OTHER (SPECIFY)		
(Record of item checked above)			
TO: DAVID SCHALLER	FROM: JOSEPH HATCH	DATE: 10/4/85	
		TIME: 11:48	
SUBJECT: SILVER CREEK TAILINGS			
SUMMARY OF COMMUNICATION  <p>Hatch is an attorney in Salt Lake City. He called to ask where he could get information on contamination at Park City Superfund site. He said he w. Martha - 10/21 Dave said you for litigation on valuation are keeper of the area. I suggested he call docket for NPL for most direct access to do comments - this is for Silver Creek ut - Kelcey</p>			
CONCLUSIONS, ACTION TAKEN OR REQUIRED  <p>File record of communication in NPL site docket for Silver Creek Tailings.</p>			
INFORMATION COPIES TO: Geise, Land. Johnson, NPL Docket, ORC			

# RECORD OF COMMUNICATION

☒ PHONE CALL   ☐ DISCUSSION   ☐ FIELD TRIP   ☐ CONFERENCE  
☐ OTHER (SPECIFY)

TO: DAVID SCHALLER

FROM: JOSEPH HATCH

(Record of item checked above)

DATE 10/4/85

TIME 11:48

SUBJECT

SILVER CREEK TAILINGS

## SUMMARY OF COMMUNICATION

Hatch is an attorney in Salt Lake City. He called to ask where he could get information on contamination at Park City Superfund site. He said he wanted the information for litigation on valuation of property in the area. I suggested he call Loretta Pickwell for most direct access to docket material.

## CONCLUSIONS, ACTION TAKEN OR REQUIRED

File record of communication in NPL site docket for Silver Creek Tailings.

## INFORMATION COPIES

TO: Geiss, Land, Johnson, NPL Docket, ORC

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Schaller

RECORD OF COMMUNICATION		<input type="checkbox"/> PHONE CALL <input type="checkbox"/> DISCUSSION <input type="checkbox"/> FIELD TRIP <input type="checkbox"/> CONFERENCE <input type="checkbox"/> OTHER (SPECIFY)	
		(Record of item checked above)	
TO: GEFSE	FROM: CHRIS SHIMPT - PAUL CARY - CLIFF CARY	DATE: 11-5-85	TIME:
SUBJECT: <i>Note (check)</i> SILVER CREEK TAILINGS - PROPOSED NPL SITE			
SUMMARY OF COMMUNICATION			
<p>SHIMPT ASKED SEVERAL QUESTIONS ABOUT LIABILITY:</p> <p>I ANSWERED -</p> <ul style="list-style-type: none"><li>• EPA has just started PRF search. Could take 6 weeks to 6 months depending on complexity.</li><li>• Explained PRF notice/registration process</li><li>• Explained that at least several liabilities and that present property owners are potentially liable - not EPA exercise discretion.</li><li>• Explained we end up with categories of PRF:<ul style="list-style-type: none"><li>• cleanup</li><li>• removal</li><li>• containment</li><li>• management/monitoring</li></ul></li></ul> <p>Shimpt asked about cleanup options. I told them about list of possible cleanup methods, including drainage control, removal, etc.</p>			
CONCLUSIONS, ACTION TAKEN OR REQUIRED			
<p><i>None</i></p>			
INFORMATION COPIES			
TO: GEFSE, Schaller			

Schaller

RECORD OF COMMUNICATION		<input type="checkbox"/> PHONE CALL <input type="checkbox"/> DISCUSSION <input type="checkbox"/> FIELD TRIP <input type="checkbox"/> CONFERENCE <input type="checkbox"/> OTHER (SPECIFY)	
		(Record of item checked above)	
TO: CEFSE	FROM: CHRIS SHIMPT - PAUL (MAY 1984) - OFFICE (MAY 1984)	DATE: 11-5-85	TIME:
SUBJECT: <i>Note (check)</i> SILVER CREEK TAILINGS - PROPOSED NPL SITE			
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CONCLUSIONS, ACTION TAKEN OR REQUIRED			
<p><i>Note</i></p>			
INFORMATION COPIES			
TO: CEFH. Schaller			

Schaller

RECORD OF COMMUNICATION		<input type="checkbox"/> PHONE CALL <input type="checkbox"/> DISCUSSION <input type="checkbox"/> FIELD TRIP <input type="checkbox"/> CONFERENCE <input type="checkbox"/> OTHER (SPECIFY)	
TO: GETSE		(Record of item checked above)	
FROM: CHRIS SHIRT - PAPER CITY REPORT Office of the		DATE: 11-5-85 TIME:	
SUBJECT: <i>Note (books)</i> SILVER CREEK TAILINGS - PROPOSED NPL SITE			
SUMMARY OF COMMUNICATION			
<p>SHIRT ASKED SEVERAL QUESTIONS ABOUT LIABILITY: I ANSWERED -</p> <ul style="list-style-type: none"><li>• EPA has just started PPF search. Could take 6 weeks to 6 months depending on complexity.</li><li>• Examined PPF notice/negotiation process</li><li>• Explained about joint &amp; several liability and that present property owners are potentially liable - but EPA exercises discretion.</li><li>• Explained we end up with categories of PPF:<ul style="list-style-type: none"><li>• Cleanup</li><li>• Removal</li><li>• Remedial</li><li>• Permanent Remediation</li></ul></li></ul> <p>SHIRT asked about cleanup options. I gave them a list of possible remedial actions, including drainage control, etc.</p>			
CONCLUSIONS, ACTION TAKEN OR REQUIRED			
<p><i>Alv</i></p>			
INFORMATION COPIES			
TO: CETH, Schaller			



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION VIII  
ONE DENVER PLACE — 999 18TH STREET — SUITE 1300  
DENVER, COLORADO 80202-2413

NOV 8 1985

Ref: 8HWM-SR

Ms. Arlene Loble  
City Manager  
City Hall  
Park City Municipal Corporation  
P. O. Box 1480  
Park City, Utah 84060

Dear Ms. Loble:

This is in response to your October 22, 1985 letter requesting information on mining sites on or proposed for the National Priorities List (NPL). A response to your second letter of October 22nd is being prepared and will be sent shortly.

I have no problem serving as your principal point of contact in the Region VIII Superfund program. However, EPA policies may at times require correspondence to be signed by persons other than myself. Other than in these instances, the communication protocol you suggest is fine.

The answers to the twelve questions you posed are for the most part found in the two enclosed tables: 1) "Mining and Mining Related NPL and Proposed Sites," (a list of the 38 mining sites that EPA has placed on, or nominated for, the NPL) and 2) "Status of Superfund Mining-Related Sites." Information on the 16 mining sites prepared prior to the nomination does not reflect NPL Update 4.

For the mining related responses to questions 1-5, 7 to information on mining related remedial investigation or feasibility studies, please contact the appropriate EPA Regional office. We do, however, have information on the Regions where the Agency has taken action. Copies of these records

*Wolby -  
Goes in Silver  
Creek Tailings  
NPL Docket  
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Thanks,  
Lina 11/12*

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For the mining related sites in EPA Region VIII, Table II provides responses to questions 1-5, 7, and 10. We do not maintain or have easy access to information on mining related sites outside of Region VIII that are in the remedial investigation or feasibility study stage. You should contact the appropriate EPA Regional office with jurisdiction over these sites for more information. We do, however, have information on mining sites from other Regions where the Agency has issued a record of decision selecting a remedial action. Copies of these records of decision are enclosed.

In question 6, you ask what data is available to compare sites. I have to emphasize that, at the NPL nomination stage of the Superfund process, no comparisons among sites are done or required by EPA for the purposes of ranking. Comparisons, in the sense of applying knowledge on a technical subject affecting selection of remedy, only occur later at the remedial investigation/feasibility study and record of decision stages of the Superfund process. I know you were trying to contact some of our Headquarters officials on this.

When the state-of-the-art of a given mine waste site technical issue is advanced as a result of remedial work or study at an NPL site, then all future mine waste site investigations may benefit. An example would be the application of knowledge regarding geochemistry and contaminant migration learned at one site to considerations of a remedy at another site at some later point in time. The range of technical issues where new knowledge on mine waste sites is continually being gained is extensive, particularly when private sector and other government research efforts are taken into account. EPA is committed to the application of state of the art of techniques when selected and designing remedies at mine waste NPL sites. We will be comparing among lessons learned nationwide as we approach clean up actions at our Region VIII mine waste sites.

Regarding your request in question 8, only the Milltown site in Montana (see Table II) has a remedial action near completion. There have been no mining sites in Region VIII cleaned up under Superfund, though some of these sites are near the end of the remedial investigation process and will be candidates for remedial action in FY 87 (less than 11 months away).

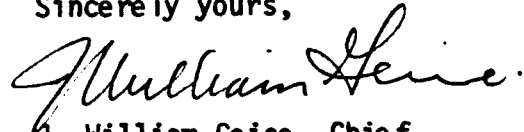
In response to question 11, no Superfund money spent to date on Region VIII mining sites has been recovered, as EPA frequently waits until completion of the remedial action at a site before attempting to recover costs from responsible parties. In some instances (see Table II), responsible parties have agreed to conduct the remedial investigation and feasibility study at NPL mining sites, in effect saving Superfund dollars for other sites.

At this time, it is not possible to state how much money will be recovered in the future at NPL sites in Region VIII, mining or otherwise, as each cost recovery action may require lengthy negotiations and possibly court proceedings. It is EPA policy to offer responsible parties the opportunity to conduct the remedial action at a site before Superfund money is used, thus eliminating the need for cost recovery after the fact. Nationwide to date, EPA has recovered nearly half a billion dollars in costs from responsible parties at NPL sites.

Table II indicates those Region VIII mining sites where no responsible parties have been identified to date and where remedial investigation work is now underway. These sites are those identified as "Fund lead." This information relates to question 12 in your letter.

I hope the enclosed information is responsive to your request. Our response to your second letter will be provided in a couple of days.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "J. William Geise".

J. William Geise, Chief  
Superfund Remedial Branch

Enclosures

cc: K. Land  
D. Schaller  
K. Alkema  
K. Lloyd  
NPL Docket: Silver Creek Tailings

<b>RECORD OF COMMUNICATION</b>		<input checked="" type="checkbox"/> PHONE CALL <input type="checkbox"/> DISCUSSION <input type="checkbox"/> FIELD TRIP <input type="checkbox"/> CONFERENCE <input type="checkbox"/> OTHER (SPECIFY)	
		(Record of item checked above)	
<b>TO:</b> Denise Sires HQ NPL Docket Clerk	<b>FROM:</b> David Schaller	<b>DATE</b> 11/26	<b>TIME</b> 8:00 a
<b>SUBJECT</b> Comments Received on Update 4			
<b>SUMMARY OF COMMUNICATION</b> <p>I called Sires to ask status of comments received by the Agency on Update 4. She said a package of all comments was pouched to us on 11/22. Summary of comments received is as follows:</p> <ul style="list-style-type: none"> <li>① Silver Creek - 5 comment packages received</li> <li>② Martin Marotta - 1 package (10pp.) received from company            [argues that score is wrong and raises the RCRA issue]</li> </ul>			
<b>CONCLUSIONS, ACTION TAKEN OR REQUIRED</b> <p>Upon receipt of comments, one copy will go to the regional docket and another copy to the appropriate RSM. [Agency policy is to continue receiving and considering "late" comments on a "best effort" basis up to final rulemaking on an update.]</p>			
<b>INFORMATION COPIES</b> <b>TO:</b> Geise, Levene, Rosenberg, Flinnian			

MEETING ON SILVER CREEK TAILINGS SITE

November 14, 1985

EPA OFFICE, DENVER

Persons attending:

<u>NAME</u>	<u>REPRESENTING</u>	<u>PHONE</u>
Bill Geise	EPA Superfund Branch	303-293-1519
Bob Duprey	EPA Hazardous Waste Management Division	303-293-1720
Larry Bardwell	Utah Bureau of Solid and Hazardous Waste	801-533-4145
Kelcey Yarbrough Land	EPA Superfund Program	303-293-1519
Matt Cohn	EPA Regional Counsel	301-293-1468
Ken Alkema	Utah Division of Environmental Health	801-533-6121
Arlene Loble	Park City	801-644-9321
Tom Clyde	Park City	801-644-9321
Ronald Crittenden	Congressman Howard Nielson	801-654-1144
	Utah 3rd District	801-377-1776
Craig Smith	Park City	801-649-9321
Ron Ivie	Park City	801-649-9321
John Hopkins	Park City (Dames & Moore)	303-232-6262
Ken Lloyd	EPA External Affairs	303-293-1700
David Schaller	EPA Superfund Program	303-293-1519

Duprey: Set the ground rules for discussion involving proposed regulations under comment period.

ALKEMA: Discussed State review and comment on HRS scoring package. Stated his belief that there was not enough evidence in package to show interconnection of aquifers. Thus HRS scoring for groundwater incorrect and ground water route should not be scored. Requested that EPA review State's comment package.

Ivie: Supported State's conclusion that site should not be scored.  
Introduce John Hopkins of Dames & Moore.

Hopkins: Explained Park City's comment package. Stated that there are only two wells of concern, but both of those to be connected to city water. City collects water from old mine tunnels and from springs. State has tested this water and it meets all drinking water standards.

Discussed Pacific Bridge Well. Currently has an ammonia problem - but only used in water supply emergencies. Has not been used since 1983. Springs are located upgradient and have a lot of flushing.

Stated that HRS surface water runoff sample was taken when there was an ice layer on Silver Creek. Therefore, sample was not representative. State data (sampling in September 1985) is the only valid sampling data. This data shows no observed release of tailings. In addition, some of the mine tailings have been covered up with topsoil since samples taken.

Contended that there is actually less irrigated acreage than scored in the HRS package.

Loble: Claimed that Mitre conversation (Johnson to Holmes of U.S.G.S) not sufficient as evidence of interconnection documentation.

Claimed that less irrigated acreage than scored in HRS package.

Expressed that NPL Listing is a stigma and the process is unfair. Felt that Mitre people contacted wrong people in asking questions. City has borne great economic burden in producing comments. City objects to any RI/FS work until comments answered. City has contracted to cover tailings with target date June 1986.

Duprey: EPA has SCAP flexibility in scheduling work at the site. Direct contact may have been big problem at site. Although not a basis for scoring, may be cause for removal action.

Loble: Complained about length of time involved in HQ review of comments.

Hopkins: Will transmit to EPA HQ, Region, and State copy of final comment package.

8HWM

Rec'd  
11/12/85  
aes.

Sanchez  
Gomez  
Johnson  
file  
file

CONTROL SLIP FOR OFFICE OF CONGRESSIONAL CORRESPONDENCE  
RM 227-G, VSNW  
382 7640

Cy: Superfund  
Emergency Resp.

CONTROL NO: AL503659

DUE DATE: 00/00/00

FROM: HONORABLE EDWIN (JAKE) GARN R/UT  
UNITED STATES SENATE  
WASHINGTON, DC 20510

INCOMING: 10/28/85

RECEIVED: 11/05/85

ASSIGNED: 11/05/85

CLOSED

CONSTITUENT:

00000

SUBJECT: COPY LETTER SILVER CREEK/SUPERFUND SITE

ASSIGNED: 1 SOLID WASTE & EMERG RESP

3

2

4

SIGNATURE:

SPECIAL INSTRUCTIONS:

FOR YOUR INFORMATION AND ACTION IF NECESSARY.

NOTE:

COURTESY COPIES:

ADMINISTRATOR  
DEPUTY ADMINISTRATOR  
A-100/MS. FISHER  
WATER  
GENERAL COUNSEL  
ENF & COMPL MONITORING  
REGION 02

REGIONAL OPERATIONS  
EXTERNAL AFFAIRS/MANSON  
CONGRESSIONAL LIAISON/DEFENER

RECEIVED  
NOV 21 1985

Superfund  
Remedial Branch

J. (JAKE) GARN  
UTAH  
505 DIRKSEN SENATE OFFICE BUILDING  
TELEPHONE 202-224-5444

JEFF M BINGHAM  
ADMINISTRATIVE ASSISTANT

11  
United States Senate

WASHINGTON, DC 20510

October 28, 1985

NOD

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EA/HANSON  
CZ/CLC  
L.I.

*Copied letter*

The Honorable Robert Stafford  
Chairman  
Senate Environment & Public Works Committee  
United States Senate  
Washington D.C. 20510

Dear Bob:

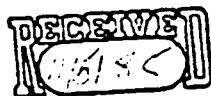
A few weeks ago while debate on the Superfund bill was underway, I approached you to relate a problem we are having at the Silver Creek/Prospector Square Superfund site at Park City, Utah.

The Silver Creek site received a score of 38.4 based on EPA modeling and was recommended to be placed on the National Priorities List (NPL) on September 17, 1985. The State of Utah Department of Health and the town of Park City both believe the data base used by EPA to score the site was flawed and that, in fact, a health hazard from those mining tailings does not exist. Those entities will ask EPA to drop the site from the the recommended list during the sixty-day comment period which is now under way.

I believe the Silver Creek site should be dropped from the recommended list if the information the state and town provide to EPA substantiates their argument against listing it. If, however, EPA legitimately determines that its earlier modeling procedures were correct and the data base valid, then I believe we should work to ensure a rapid clean-up effort at the site.

With respect to the Superfund scoring and listing process, I would hope that the corrective measures for mining sites provided in the Baucus amendment will be maintained in the final version of the Superfund bill. I respectfully request your support of that amendment in the upcoming conference with the House. Most importantly, I hope Senate Conferees will insist that the retroactive date of July 1, 1985, which is now included in the Baucus amendment, be maintained so it will help us with the Silver Creek problem at Park City.

Local officials in Park City are angry because their town must suffer the stigma of a hazardous dump site while the EPA pursues a policy of "list it now, ask questions later." By recommending the Silver Creek site to the NPL, EPA's scoring and modeling procedures do not take into account remedial actions which have



The Honorable Robert Stafford  
October 28, 1985  
Page 2

already been taken by the town to protect its water supply from contamination. Under this approach to listing new sites, it is obvious that EPA presumes the town of Park City to be guilty until it can provide evidence that it is innocent. I believe this policy is wrong and must be corrected. If nothing else, the Baucus amendment will help small mining towns like Park City by requiring more thorough reviews of potential Superfund sites before they are recommended to be listed on the National Priorities List.

Please know I stand willing to do whatever I can to assist you in your efforts to preserve the Baucus amendment in Conference and make it apply to our situation at Park City.

Sincerely,



Jake Garn

JG/rwa

c: The Honorable Lloyd Bentsen  
Administrator Lee Thomas

MITRE

Silver Creek  
Serial

11 February 1985  
W52-677

Mr. Eric Johnson  
U.S. Environmental Protection Agency  
1860 Lincoln St.  
Denver, CO 80295

Dear Mr. Johnson:

Enclosed are the quality assured scoring and documentation sheets for Silver Creek Tailings for submission by the Region to headquarters. MITRE has already informed headquarters that the QA score is 38.40.

Also enclosed for the Region's file on Silver Creek Tailings are three memos of phone calls that are references 12, 14 and 15. Please note that the log of your phone call to Mark Oliver should be titled reference 16 and placed in the site file. A copy of this reference should be sent to MITRE.

If you have any questions, please call Mr. Channing Johnson on (703) 883-6095 or me on (703) 883-7676.

Sincerely,

*Sue Russell*

L. Sue Russell  
Task Leader, Update #3  
Engineering and Safety Systems

LSR:kes

Enclosure

Facility name: Silver Creek Tailings

Location: Park City, Summit County, Utah

EPA Region: VIII

Person(s) in charge of the facility: Park City Municipal Corporation

Name of Reviewer: Eric Johnson Date: 1/15/85

General description of the facility:  
 (For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

The Prospector Square area of Park City is constructed upon  
abandoned mine tailings. The mine tailings contain elevated  
levels of heavy metals. Tailings are exposed on the ground and  
are a potential source of contamination to the ground and  
surface water regimes of the area as well as to the air.

Scores:  $S_M = 38.40$   $(S_{gw} = 61.36)$   $S_{sw} = 25.45$   $S_a = 0$

$S_{FE} =$

$S_{DC} =$

**FIGURE 1**  
**HRS COVER SHEET**

QA —  
 R. M. Johnson  
 7 Feb 85

Ground Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
<b>1</b> Observed Release	0 45	1	0	45	3.1	
If observed release is given a score of 45, proceed to line <b>4</b> . If observed release is given a score of 0, proceed to line <b>2</b> .						
<b>2</b> Route Characteristics					3.2	
Depth to Aquifer of Concern	0 1 2 <b>3</b>	2	6	6		
Net Precipitation	<b>0</b> 1 2 3	1	0	3		
Permeability of the Unsaturated Zone	0 1 <b>2</b> 3	1	2	3		
Physical State	0 1 2 <b>3</b>	1	3	3		
Total Route Characteristics Score			11	15		
<b>3</b> Containment	0 1 2 <b>3</b>	1	3	3	3.3	
<b>4</b> Waste Characteristics					3.4	
Toxicity/Persistence	0 3 6 9 12 15 <b>18</b>	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 <b>8</b>	1	8	8		
Total Waste Characteristics Score			26	26		
<b>5</b> Targets					3.5	
Ground Water Use	0 1 2 <b>3</b>	3	9	9		
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 <b>32</b> 35 40	1	32	40		
Total Targets Score			41	49		
<b>6</b> If line <b>1</b> is 45, multiply <b>1</b> x <b>4</b> x <b>5</b> If line <b>1</b> is 0, multiply <b>2</b> x <b>3</b> x <b>4</b> x <b>5</b>			35178	57,330		
<b>7</b> Divide line <b>6</b> by 57,330 and multiply by 100			S <sub>gw</sub> = 61.36			

**FIGURE 2  
GROUND WATER ROUTE WORK SHEET**

*RCJ*  
2/7/85

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
<b>1</b> Observed Release	0 <b>45</b>	1	45	45	4.1	
If observed release is given a value of 45, proceed to line <b>4</b> . If observed release is given a value of 0, proceed to line <b>2</b> .						
<b>2</b> Route Characteristics					4.2	
Facility Slope and Intervening Terrain	0 1 2 3	1		3		
1-yr. 24-hr. Rainfall	0 1 2 3	1		3		
Distance to Nearest Surface Water	0 1 2 3	2		6		
Physical State	0 1 2 3	1		3		
Total Route Characteristics Score				15		
<b>3</b> Containment	0 1 2 3	1		3	4.3	
<b>4</b> Waste Characteristics					4.4	
Toxicity/Persistence	0 3 6 9 12 15 <b>18</b>	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 <b>8</b>	1	8	8		
Total Waste Characteristics Score			26	26		
<b>5</b> Targets					4.5	
Surface Water Use	0 1 <b>2</b> 3	3	6	9		
Distance to a Sensitive Environment	<b>0</b> 1 2 3	2	0	6		
Population Served/Distance to Water Intake Downstream	0 4 6 <b>8</b> 10 12 16 18 20 24 24 30 32 35 40	1	8	40		
Total Targets Score			14	55		
<b>6</b> If line <b>1</b> is 45, multiply <b>1</b> x <b>4</b> x <b>5</b> If line <b>1</b> is 0, multiply <b>2</b> x <b>3</b> x <b>4</b> x <b>5</b>			16380	64,350		
<b>7</b> Divide line <b>6</b> by 64,350 and multiply by 100			$S_{sw} = 25.45$			

**FIGURE 7**  
**SURFACE WATER ROUTE WORK SHEET**

*Rid*  
2/19/85

Air Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
<b>[1]</b> Observed Release	0                  45	1	0	45	5.1	
Date and Location:						
Sampling Protocol:						
If line <b>[1]</b> is 0, the $S_a = 0$ . Enter on line <b>[5]</b> . If line <b>[1]</b> is 45, then proceed to line <b>[2]</b> .						
<b>[2]</b> Waste Characteristics					5.2	
Reactivity and Incompatibility	0 1 2 3	1		3		
Toxicity	0 1 2 3	3		9		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8		
Total Waste Characteristics Score				20		
<b>[3]</b> Targets					5.3	
Population Within 4-Mile Radius	{ 0 9 12 15 18 21 24 27 30	1		30		
Distance to Sensitive Environment	0 1 2 3	2		6		
Land Use	0 1 2 3	1		3		
Total Targets Score				39		
<b>[4]</b> Multiply <b>[1]</b> x <b>[2]</b> x <b>[3]</b>				35,100		
<b>[5]</b> Divide line <b>[4]</b> by 35,100 and multiply by 100			$S_a = 0$			

**FIGURE 9**  
**AIR ROUTE WORK SHEET**

*RCF*  
*2/18/85*

	s	s <sup>2</sup>
Groundwater Route Score (S <sub>gw</sub> )	61.36	3765.05
Surface Water Route Score (S <sub>sw</sub> )	25.45	647.70
Air Route Score (S <sub>a</sub> )	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		4412.75
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		66.43
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		38.40

**FIGURE 10**  
**WORKSHEET FOR COMPUTING S<sub>M</sub>**

*RCJ*  
*2/19/85*

DOCUMENTATION RECORDS  
FOR  
HAZARD RANKING SYSTEM

INSTRUCTIONS: As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference. Include the location of the document.

FACILITY NAME: Silver Creek Tailings

LOCATION: Park City, Summit Co., Utah

DATE SCORED: 2/7/85

PERSON SCORING: Eric Johnson/R. Channing Johnson

PRIMARY SOURCE(S) OF INFORMATION (e.g., EPA region, state, FIT, etc.):

See References

FACTORS NOT SCORED DUE TO INSUFFICIENT INFORMATION:

None

COMMENTS OR QUALIFICATIONS:

## GROUND WATER ROUTE

### 1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Rationale for attributing the contaminants to the facility:

\* \* \*

### 2 ROUTE CHARACTERISTICS

#### Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

The aquifers in the vicinity of the site (Ref. 2) function as a single hydrological unit for HRS purposes as demonstrated by the Park Meadow Well test (Ref. 12). USGS topo maps for locations (Ref. 13).

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Less than 10'; Ref. 2, page 1

Depth from the ground surface to the lowest point of waste disposal/storage:

11'; Ref. 4, borehole #5

HRS value = 3

*Ref*  
*2/7/85*

### Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

~20" per year

Ref. 5

Mean annual lake or seasonal evaporation (list months for seasonal):

~32" per year

Ref. 6

Net precipitation (subtract the above figures):

-12" approximately

HRS Value = 0

### Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Thin gravels to thick fine-grained alluvial soil on the valley bottoms.

Ref. 3, page 8

Permeability associated with soil type:

$10^{-2}$  cm/sec to  $10^{-5}$  cm/sec

Ref. 3, page 8

HRS Value = 2

### Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Ref. 7 (cover letter) states that it is believed that some of the tailings were water-slurried to the site. This was common practice.

HRS Value = 3

\* \* \*

Ref  
2/7/85

### 3 CONTAINMENT

#### Containment

Method(s) of waste or leachate containment evaluated:

The tailings were deposited without containment on top of the natural soils.

Ref. 4, boreholes

Method with highest score:

Piles uncovered, waste unstabilized, no liner.

HRS Value = 3

### 4 WASTE CHARACTERISTICS

#### Toxicity and Persistence

Compound(s) evaluated:

Arsenic

Cadmium

Lead

Samples of tailings in Ref. 7

Compound with highest score:

Lead

HRS Value = 18

#### Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

645,333 yd<sup>3</sup>

Basis of estimating and/or computing waste quantity:

80 acres times 5' average depth (depth ranges from 1 to 10')

Ref. 7, cover letter

HRS Value = 8

\* \* \*

*RCJ*  
*2/3/85*

## 5 TARGETS

### Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Private wells east of the site on route 40 have no alternative supply. Also Theriot Springs and Spiro Tunnel of Park City supply are slightly over 1 mile from the site.

Ref. 14, Ref. 9

HRS Value = 3

### Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

East of site along route 40

Ref. 14

Distance to above well or building:

3/4 mile

Ref. 14

HRS Value = 3

### Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Theriot Spring and Spiro Tunnel of Park City system with 2400 metered connections plus businesses.  $*3.8 \text{ persons/connection} = 9120$   
2 private wells on route 40:  $5*3.8 = 19$

Ref. 14,15

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

None identified

Total population served by ground water within a 3-mile radius:

9139

This is a minimum estimate of the winter population which may include over 10,000 tourists plus permanent population.

Ref. 15

HRS Value = 4      HRS Matrix = 32

## SURFACE WATER ROUTE

### 1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

Lead; Ref. 10 - attached data sheet

Note that As, Cd, Cr, Cu and Zn were also somewhat elevated in the downstream sample versus the upstream background

Rationale for attributing the contaminants to the facility:

Pb at 112 ppb in melt flowing from tailings pile into Silver Creek vs. 5 ppb just upstream in Silver Creek. Ref. 10, Ref. 14. These contaminants are found in the tailings (Ref. 7)

HRS Value = 45

\* \* \*

### 2 ROUTE CHARACTERISTICS

#### Facility Slope and Intervening Terrain

Average slope of facility in percent:

Name/description of nearest downslope surface water:

Average slope of terrain between facility and above-cited surface water body in percent:

Is the facility located either totally or partially in surface water?

Is the facility completely surrounded by areas of higher elevation?

1-Year 24-Hour Rainfall in Inches

Distance to Nearest Downslope Surface Water

Physical State of Waste

\* \* \*

### 3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

*R. J.*  
*2/17/85*

#### 4 WASTE CHARACTERISTICS

##### Toxicity and Persistence

Compound(s) evaluated

Lead	}	See ground water route
Arsenic		
Cadmium		
HRS Value = 18		
Compound with highest score:		
Lead		

##### Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

645,333 yd<sup>3</sup>

Basis of estimating and/or computing waste quantity:

See ground water route

HRS Value = 8

\* \* \*

#### 5 TARGETS

##### Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Irrigation of hay and pasture grass

Ref. 11

HRS Value = 2

*R.D.*  
*2/5/85*

Is there tidal influence?

No

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

None identified

Ref. 13

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None identified

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

Between  $2\frac{1}{2}$  and  $2\frac{3}{4}$  miles downstream from the site

Ref. 16

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

500 acres or more

Ref. 11, Ref. 16

Total population served:

$$500 * 1.5 = 750$$

Name/description of nearest of above water bodies:

Silver Creek

Distance to above-cited intakes, measured in stream miles.

This acreage lies within 3 stream-miles from the site

HRS Value = 8

Rec'd  
2/9/83

## AIR ROUTE

### 1 OBSERVED RELEASE

#### Contaminants detected:

Although dust samples in houses have shown contamination, the procedures used do not establish for HRS purposes that the contaminants migrated specifically by the air route.

HRS Value = 0

#### Date and location of detection of contaminants

#### Methods used to detect the contaminants:

#### Rationale for attributing the contaminants to the site:

\* \* \*

### 2 WASTE CHARACTERISTICS

#### Reactivity and Incompatibility

#### Most reactive compound:

#### Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

\* \* \*

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi

0 to 1 mi

0 to 1/2 mi

0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

Red  
2/1/83

## REFERENCES

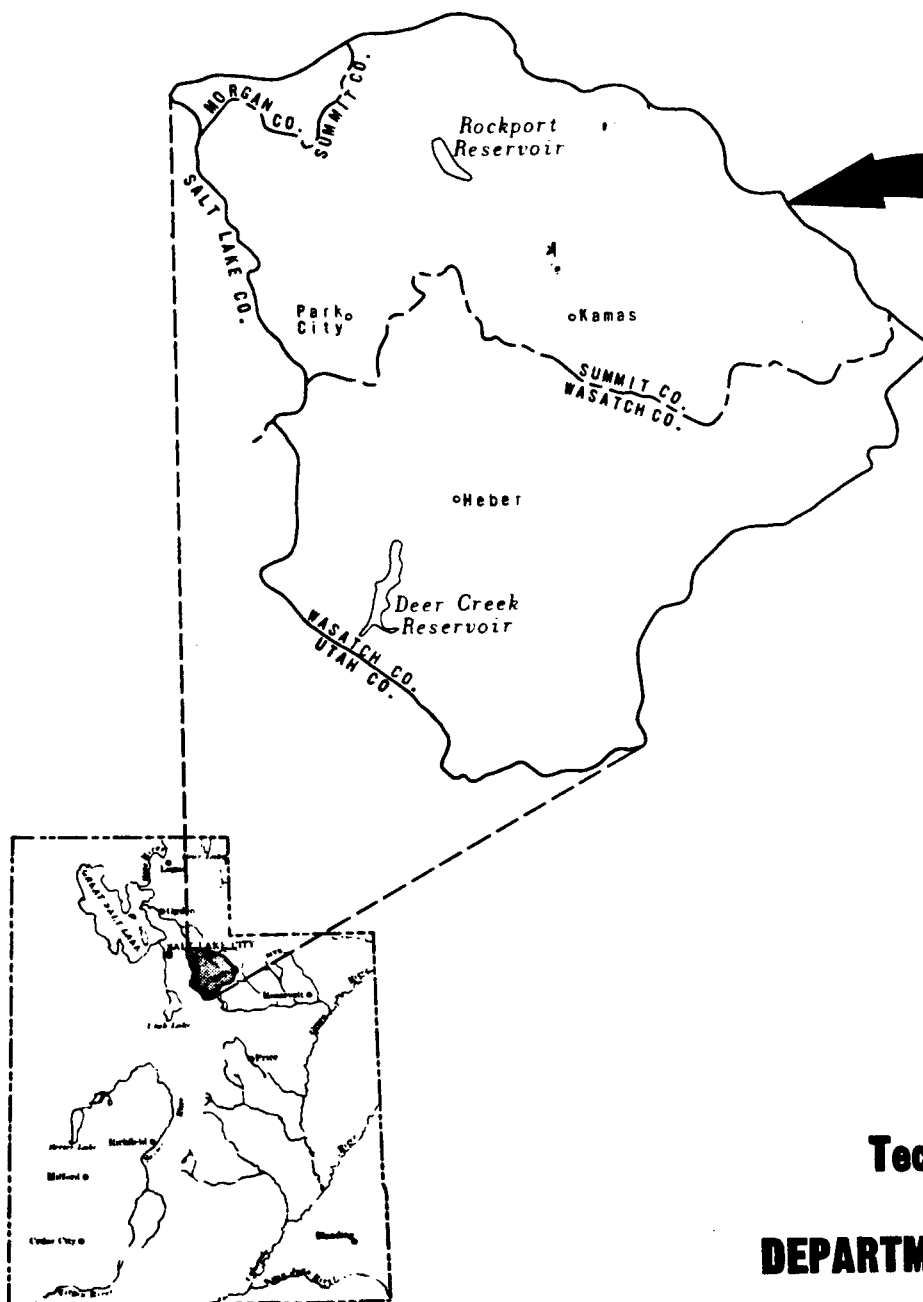
If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found.

Reference Number	Description of the Reference
1)	Uncontrolled Hazardous Waste Site Ranking System: A Users Manual. 47 FR 31219-31243, 16 July 1982 (Appendix A, CERCLA)
2)	Water Resources of the Heber-Kamas-Park City Area, North-central Utah. Tech. Pub. #27, State of Utah, Dept. of Nat. Resources, 1970.
3)	Engineering Geology of Park City, Summit County, Utah. Utah Geological and Mineral Survey, Utah Dept. of Nat. Resources; Special Studies 66, June 1984.
4)	Boring Logs, Prospector Square Area, Park City, Utah. Utah Geological and Mineral Survey, December 1983.
5)	Mean Annual Precipitation, Climatic Atlas of the U.S., U.S. Dept. of Commerce, June 1968.
6)	Climatic Atlas of the United States, U.S. Dept. of Commerce.
7)	State of Utah, Dept. of Health, Div. of Env. Health Site Inspection Report for Prospector Square, Park City, Utah, 8/30/84.
8)	Sax, N.I., 1979; Dangerous Properties of Industrial Materials, 5th Ed. Van Nostrand and Reinhold Co., NY
9)	Park City Water Resources Study, Nov. 1982, J.J. Johnson and Assoc., Park City, Utah.
10)	Preliminary Assessment, State of Utah, Dept. of Health, Div. of Env. Health, January 1983.
11)	Personal communication, Marc Gesink to Fred Duberow, J.J. Johnson and Assoc. 4/23/84 (801) 649-9811
12)	Phone call: R. Channing Johnson, MITRE Corp. to Walt Holmes, USGS, Salt Lake City. 2/7/85
13)	USGS 7½' maps: Park City East, Utah (1955) and Park City West, Utah (photorevised, 1975).
14)	Phone call: R. Channing Johnson, MITRE Corp. to Marv Maxell, Utah Dept. of Health. 2/6/85.
15)	Phone call: R. Channing Johnson, MITRE Corp. to Gerry Gibbs, Director, Dept. of Public Works, Park City, Utah. 2/5/85.
16)	Phone call: Eric Johnson, USEPA to Mark Oliver, J.J. Johnson Assoc. 2/7/85.

*Red*  
*2/11/85*

# WATER RESOURCES OF THE HEBER-KAMAS-PARK CITY AREA NORTH-CENTRAL UTAH

#2



**HEBER-KAMAS-  
PARK CITY AREA**

**Technical Publication No. 27  
State of Utah  
DEPARTMENT OF NATURAL RESOURCES  
1970**

**U T A H**

# WATER RESOURCES OF THE HEBER-KAMAS-PARK CITY AREA NORTH-CENTRAL UTAH

by

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## ABSTRACT

The Heber-Kamas-Park City area encompasses about 810 square miles in Wasatch and Summit Counties, in north-central Utah, and includes four mountain valleys—Heber Valley, Rhodes Valley, Parleys Park, and Round Valley—with most of the surrounding watersheds. Parleys Park and most of Rhodes Valley are in the Weber River drainage basin; Heber and Round Valleys are in the Provo River drainage basin.

The Provo River rises in the southwestern Uinta Mountains and flows to Utah Lake. At Deer Creek Dam, on the boundary of the study area, the average annual discharge of the Provo River for the 14-year period 1953-67 was 256,300 acre-feet per year; an additional 33,900 acre-feet per year (average) was diverted for use outside the drainage basin. An average of 68,000 acre-feet of water per year is added to the Provo River by diversion from other drainage basins.

The Weber River has its headwaters in the northwestern Uinta Mountains, and flows to Great Salt Lake. The average discharge of the Weber River below Wanship Dam near the north end of the study area, for the 10-year period 1957-67, was 110,000 acre-feet per year. During that period, an average of 50,600 acre-feet per year was diverted from the drainage basin above Wanship Dam. The surface-water discharge from Parleys Park enters the Weber River below Wanship Dam through East Canyon Creek and Silver Creek; the discharge from Parleys Park averages about 20,000 acre-feet per year.

The consolidated rocks of the Wasatch Range and Uinta Mountains contain large quantities of ground water, mostly in fractures and solution openings, and numerous springs discharge water from the consolidated rocks. Despite the abundance of springs and the fact that mine workings in the Wasatch Range tap large flows of ground water, most wells yield only small supplies of water from the consolidated rocks. The primary permeability of the rocks is low, and wells can produce large yields only if they intersect fractures and solution openings.

Consideration of the water budget for Deer Creek Reservoir, astride the Charleston thrust fault, indicates that there is no net loss of water from the reservoir through the fault. An unbalance of about 17,000 acre-feet of water per year in the water budget for the valley fill in Heber Valley, however, may represent outflow from the valley through the consolidated rocks.

Most of the wells in the area derive water from the unconsolidated alluvial fill in the four valleys. The valley fill consists of a poorly sorted mixture of rock material ranging in size from clay through boulders. There is no evidence to suggest the presence of zones of either very high or very low permeability in any of the valleys; and the valley fill in all the valleys is saturated, generally to within a few feet of the land surface, mostly with unconfined ground water.

Geophysical studies indicate that the valley fill may be as much as 800 feet thick in the deepest parts of Heber Valley and more than 300 feet thick in most of Rhodes Valley. Rocks of Tertiary and Quaternary age are more than 1,600 feet thick in the northern part of Rhodes

given in table 1. This is a composite section and nowhere in the area are all the formations present. Plate 2 is a geologic map showing the areal distribution of the various rock units.

The rocks in both the Wasatch Range and the Uinta Mountains have been subjected to considerable deformation and are greatly fractured, faulted, and folded. The most prominent displacement in the area is the Charleston thrust fault, which crosses the south end of Heber Valley. Several smaller thrust faults have been mapped, and high-angle faults of small displacement are numerous. Joints and fractures are ubiquitous, and solution openings are common in the carbonate rocks. These openings and the faults play a major role in controlling the movement of ground water in the area. Small folds are abundantly present, but they exert little influence on ground-water movement.

Water moves through the rocks along the abundant fractures, solution openings, and fault planes, and thus any formation may be, at least locally, water bearing. In his report on the Park City Mining District, Boutwell (1912, p. 24) observed that the water in the mines came principally from "the red shale and massive quartzite" (Woodside Formation and Weber Quartzite). Officials of the United Park City Mining Co. agree that most of the water in that company's workings appears in tunnels that penetrate the Weber Quartzite (J. Ivers, Jr., oral commun., 1967).

In 1967, the few wells in the project area that were finished in the consolidated rocks derived their water from only 11 of the more than 30 geologic units under the area. The producing formations were the Quaternary tufa deposits, the Tertiary volcanic rocks, the Knight Conglomerate, the Preuss Sandstone, the Twin Creek Limestone, the Nugget Sandstone, the Chinle Formation, the Ankareh Formation, the Thaynes Formation, the Oquirrh Formation, and the Weber Quartzite. Other units, especially the carbonate rocks of Pennsylvanian, Mississippian, and Devonian age, yield water to springs in the area, and Feltis (1966, p. 14-17) states that in the Uinta Basin, southeast of the study area, some water is obtained from the Park City Formation of Permian age and from the Uinta Formation of Tertiary age. More wells in the study area obtain water from the Tertiary volcanic rocks than from any of the other formations, probably because the volcanic rocks are the shallowest consolidated rocks in the areas where most of the bedrock wells are located.

#### Aquifer characteristics

In a broad way, for the purpose of evaluating areal movement of ground water, the highly fractured rocks of the Wasatch Range can be regarded as a single homogeneous aquifer, and the same is probably true of the rocks in the Uinta Mountains. On the small scale involved in selecting sites for the development of water supplies, however, the aquifers are grossly heterogeneous. Information from drillers' tests of wells finished in the consolidated rocks shows that the development of supplies of water sufficient for irrigation, industrial needs, or public supplies from the consolidated rocks depends upon the wells intersecting water-bearing fractures. Even in a fracture system that is properly described as "closely spaced," however, the distance between adjacent fractures may be very large compared to the diameter of a well. Hence, the construction of wells to intercept water moving through fractured rocks tends to be a "hit-or-miss" affair. The large discharge of water from mine tunnels near Park City should not be taken as an indication of the potential yield of wells. Each tunnel drains many miles of workings, whereas a well usually drains a relatively small area. Small supplies, adequate for domestic use in single-family dwellings, can probably be obtained from several of the consolidated rock units.

Drillers' reports of a few wells (table 3) include the results of pumping tests, generally of only a few hours duration. The test results were evaluated by the method of Theis and others (1963) to derive the values of aquifer transmissivity included in table 1.

Table 1.—Generalized stratigraphic summary of the consolidated rocks of the Heber-Kamas-Park City area—continued

Age	Formation	Lithology and thickness	Water-bearing properties
Pennsylvanian	Weber Quartzite	Chiefly gray crossbedded sandstone. Thickness up to 3,000 feet.	Yields small amounts of water to a few wells. Primary permeability is very low, but reportedly yields large quantities of water from fractures in the mine workings near Park City. Principal source of water in the mines.
	Morgan Formation	Red sandstone and shale interfingers with the Weber Quartzite in part. Thickness up to 1,000 feet.	No information on water-bearing properties in the study area, but primary permeability is probably low.
	Round Valley Limestone	Light-gray marine limestone. Thickness 250-400 feet.	No wells penetrate the formation in the study area, but it yields water to numerous springs.
Pennsylvanian and Mississippian	Manning Canyon Shale	Marine shale, siltstone, claystone, and limestone. Thickness 300-500 feet.	Not penetrated by wells in the area, but supplies a few small springs.
Mississippian and Devonian	Mississippian and Devonian rocks undivided	Chiefly marine limestones and dolomites. Thickness from 3,000 to 6,000 feet.	Not penetrated by wells in the area, but yields water from fractures and solution openings to many springs. A major aquifer.
Cambrian	Cambrian sedimentary rocks undivided	Chiefly shales and quartzites. Thickness uncertain, probably up to 3,000 feet.	Not known to yield water in the study area.
Precambrian	Precambrian rocks undivided	Chiefly metasediments. Thickness unknown.	Water-bearing potential unknown, but probably small.

#### Recharge

In most of the mountainous area, the soil cover is thin and permeable, and rain or snowmelt can infiltrate readily. The rapidity of infiltration into the rocks in the mountains is indicated by the reports that the discharge of the mine tunnels in the Park City area increases noticeably during the period of spring snowmelt and runoff. Moreover, observation well (D-2-5)32bad-1, finished in the Tertiary volcanic rocks, shows small rises of water level only a few hours after a rainstorm over the area. The water level in one of the nonflowing thermal springs near Midway (see p. 21) also rises rapidly in response to rain or snowmelt in the mountains.

#### Movement

As has been indicated, water moves through the consolidated rocks readily, principally along the abundant zones of fracturing and solution openings. The direction of movement is, in general, downhill from recharge areas in the mountains to discharge areas near the margins of the valleys.

Whether any appreciable amount of water leaves the study area through the consolidated rocks is difficult to ascertain, but an unbalance of 17,000 acre-feet per year in the ground-water budget for Heber Valley is probably due to movement out of the valley through the consolidated rocks. The structural feature most commonly suspected of draining water from the area is the Charleston thrust fault, which passes entirely through the Wasatch Range. Deer Creek Reservoir, on the Provo River, lies directly across the outcrop of the Charleston and associated Deer Creek thrust fault (see pl. 2), and the water budget for Deer Creek Reservoir (see p. 8) indicates that there is no loss of water from the reservoir along the thrust planes. Because there is no detectable movement of water from Deer Creek Reservoir down the Charleston thrust fault, it is probable that no significant amount of ground water leaves the study area along the fault.

## Discharge

The principal manmade discharge of water from the consolidated rocks in the area is through the extensive mine workings in the vicinity of Park City (fig. 7). The amount of water discharged by the few small-capacity wells that penetrate the consolidated rocks is only a very small part of the total discharge. Natural discharge is through numerous springs, mostly around the margins of the valleys, and through direct infiltration into the unconsolidated deposits in the valleys.

The total discharge from mine tunnels is estimated as at least 50 cfs (cubic feet per second) or 36,000 acre-feet per year. The discharge of the Spiro Tunnel, near Park City, was reported in 1935 as about 15 cfs and "a rather steady flow" for several years (G. H. Taylor, written commun., 1935). The flow of Drain Tunnel Creek, which consists principally of the discharge of the Ontario No. 2 Drain Tunnel, is measured at a weir about 5 miles downstream from the mouth of the tunnel (fig. 2). The losses to evapotranspiration between the tunnel mouth and the weir probably equal or exceed any gains from ground-water discharge to the stream. The average discharge of Drain Tunnel Creek is 15.9 cfs (18 years of record). The drainage from the Mayflower Mine enters Drain Tunnel Creek downstream from the above-mentioned weir; in 1967-68 the discharge of the Mayflower Mine drainage was estimated as about one-half that of Drain Tunnel Creek at the weir. Smaller amounts of water are discharged from other tunnels in the area.

The water discharged from the Alliance Tunnel (quantity unknown) provides the municipal supply for Park City; the discharge from the other tunnels is used for irrigation in Parleys Park and Heber Valley.

A large but undetermined amount of water is discharged from the consolidated rocks through numerous springs. In 1968, the Utah State Engineer's records included claims to water from about 250 springs that discharge water from the consolidated rocks. The springs are nearly all associated with fractures or solution openings. The largest springs in the area flow from solution openings in the limestones of Pennsylvanian and Mississippian age. For example, three springs near the mouth of Snake Creek Canyon discharged about 13 cfs from the limestones during the summer of 1967.

An unusual hydrologic feature of Heber Valley is a group of thermal springs near the town of Midway. Although the springs are located on the Snake Creek alluvial fan, and are underlain in part by alluvium, their source is deep seated and they represent discharge from the consolidated rocks. A more detailed discussion of the thermal springs has been given elsewhere (Baker, 1968), and they will be described only briefly here.

Most of the thermal springs do not flow and are known locally as "hot pots." The typical hot pots are small pools of warm water that occupy shallow depressions in the tops of mounds of calcareous tufa (fig. 8). Seventeen hot pots in the area have been examined by the writer. Four of the hot pots are artificially discharged to supply water to swimming pools at resorts, 2 pots occasionally overflow, and the other 11 discharge water at the land surface only by evaporation, although some thermal water may be discharged into the valley fill in the subsurface.

The temperature of the water in the 13 pots without artificial discharge ranges from 12° to 34°C (54°-94°F), and the highest temperatures are in the 2 pots that occasionally overflow. Water temperature in the 4 pots that are artificially discharge ranges from 38° to 40°C (100°-104°F). Addition of heated water from below to many of the pots is very slow, and the water of a few pots is lower than that properly classified as "thermal."

Unconsolidated deposits cover only about 21 square miles of Parleys Park along Silver and East Canyon Creeks and in the flats northwest of Quarry Mountain (pl. 2); the rest of the park is underlain by consolidated rocks, principally the Tertiary volcanic rocks and the Knight Conglomerate. Little information is available about the thickness of the unconsolidated deposits. The contact between the unconsolidated material and the underlying volcanic rocks or Knight Conglomerate is difficult to recognize in boreholes, and drillers often fail to recognize the contact. The differences in density between the unconsolidated deposits and the underlying material are too small to give conclusive results by gravity methods. The best information available suggests a maximum thickness of about 100 feet and an average thickness of about 60 feet.

The unconsolidated deposits in Parleys Park, as in Heber Valley and Rhodes Valley, consist of a poorly sorted mixture of material ranging in size from clay to cobbles. There appear to be no well-defined beds of material of very high or very low permeability, and no indications of the existence of artesian conditions. The unconsolidated deposits are saturated to within a few feet of the land surface with unconfined ground water.

There are very few wells in the unconsolidated deposits of Parleys Park to provide a basis for estimating the transmissivity and specific yield of the aquifer. The specific capacity of one well is reported as 20 gpm per foot of drawdown; such a specific capacity suggests an aquifer transmissivity of about 4,670 ft<sup>3</sup>/d/ft. The aquifer at the well location is about 100 feet thick, giving an estimated hydraulic conductivity of about 50 ft<sup>3</sup>/d/ft<sup>2</sup>—about the same as the value derived for similar material in Heber Valley. The few drillers' logs available are not suitable for calculating specific yield by the method used in Heber Valley and Rhodes Valley; however, an estimate of 15 percent, based on the values derived in the other areas, is probably in the right range.

Recharge to the unconsolidated deposits in Parleys Park comes primarily from the direct infiltration of precipitation on the park and runoff from the surrounding mountains, and secondarily from subsurface inflow through the consolidated rocks. Available data on the annual range of water-level fluctuations are too scanty to permit a direct estimate of the average annual recharge. The probable minimum recharge is indicated by the estimated evapotranspiration (see below).

The inferred direction of ground-water movement in Parleys Park is shown in figure 17. Water in the eastern arm of the park moves toward Silver Creek and down the valley. In the western arm of the park, ground water moves generally northward toward East Canyon Creek. Each of the small tributaries of East Canyon Creek that crosses the park is a gaining stream, however, and locally ground water moves toward each of these streams.

The water-level fluctuations in well (D-1-4)31bdb-1 were observed from 1936 to 1948; the well was destroyed in 1948. Well (D-1-4)31adb-1 was monitored by an automatic water-level recorder that was installed in October 1966 and operated intermittently through 1968. Graphs of water levels in these wells are shown in figure 18. The short-term record of well (D-1-4)31adb-1 shows annual fluctuations of more than 17 feet, but the longer record of well (D-1-4)31bdb-1 shows no substantial long-term change in the position of the water table.

Any calculation of the amount of water available from storage in the unconsolidated deposits of Parleys Park can be only a rough estimate. The maximum depth to water recorded in well (D-1-4)31adb-1 was nearly 20 feet; if the average thickness of the unconsolidated deposits is 60 feet, the average saturated thickness (when the water table is lowest) is about 40 feet. If the

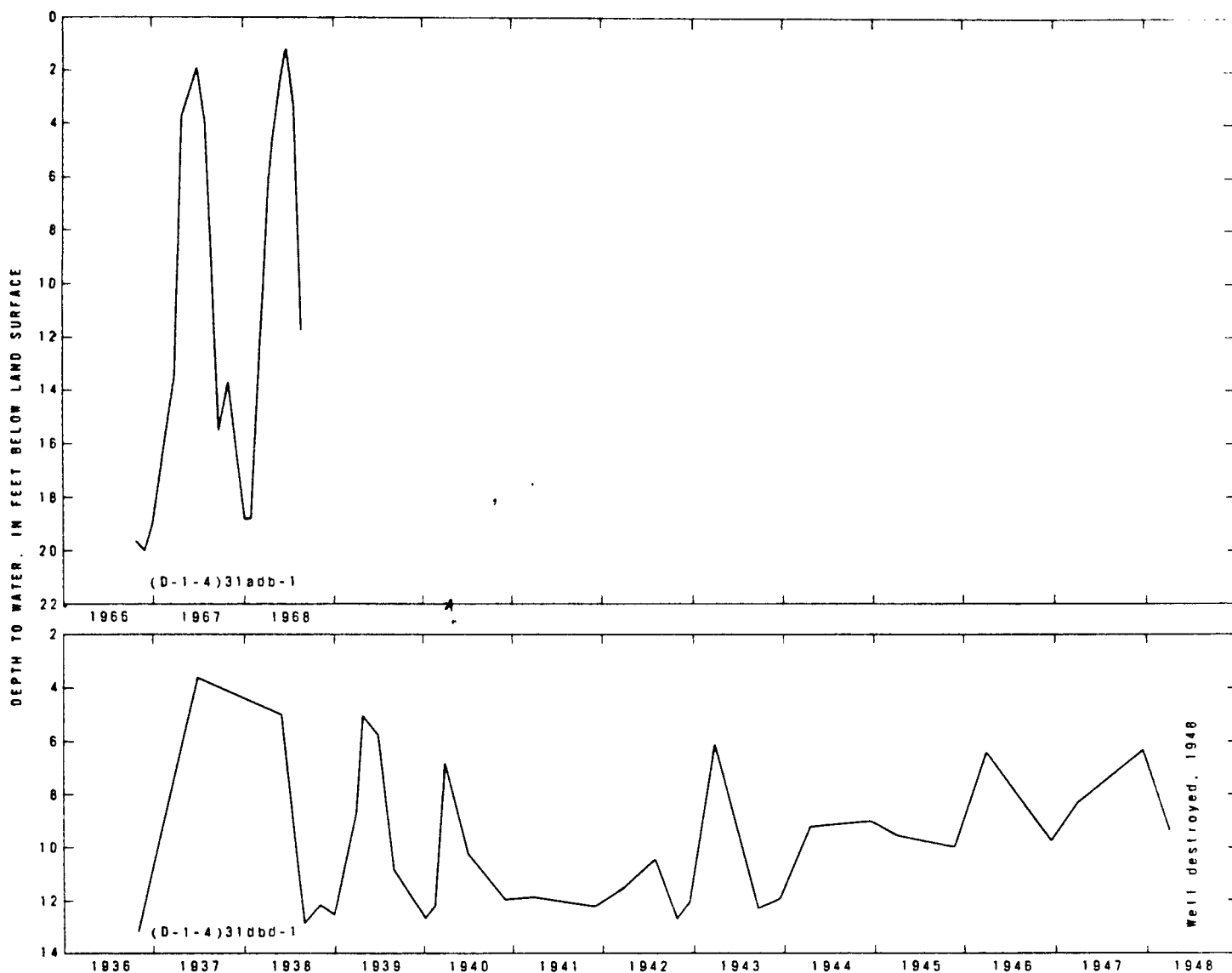


Figure 18.—Graphs of water levels in wells tapping the unconsolidated deposits in Parleys Park.

saturated thickness is 40 feet, the area 21 square miles (about 13,000 acres), and the specific yield 15 percent, the volume of recoverable water in storage is about 80,000 acre-feet. As in the other calculations of storage, this volume of water is theoretically recoverable by dewatering the aquifer; dewatering the aquifer, however, may not be practicable in the foreseeable future.

The combined discharge from wells and discrete springs in the unconsolidated deposits in Parleys Park is small. Large seeps or marshy areas are common in the park, however, especially during the summer months; and these areas discharge large quantities of ground water by evapotranspiration. The total evapotranspiration from the park is calculated by the Blaney-Criddle method as 43,000 acre-feet per year based on air temperatures measured at Park City during the period 1921-50. Ground water is also discharged directly to Silver Creek and to East Canyon Creek and its tributaries; all the streams in the park appear to be gaining streams most of the year. It is possible that water also moves from the unconsolidated deposits into the consolidated rocks at the north end of the park.

Gill and Lund - Engineering Geology of Park City, Summit County, Utah

# ENGINEERING GEOLOGY OF PARK CITY, SUMMIT COUNTY, UTAH

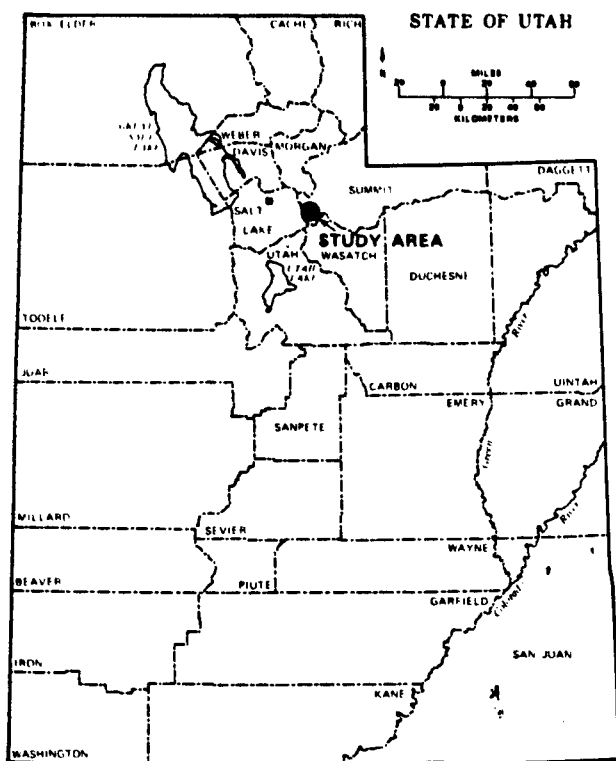
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Special Studies 66

**UTAH GEOLOGICAL AND MINERAL SURVEY**  
a division of  
Utah Department of Natural Resources

**Special Studies 66****June 1984**



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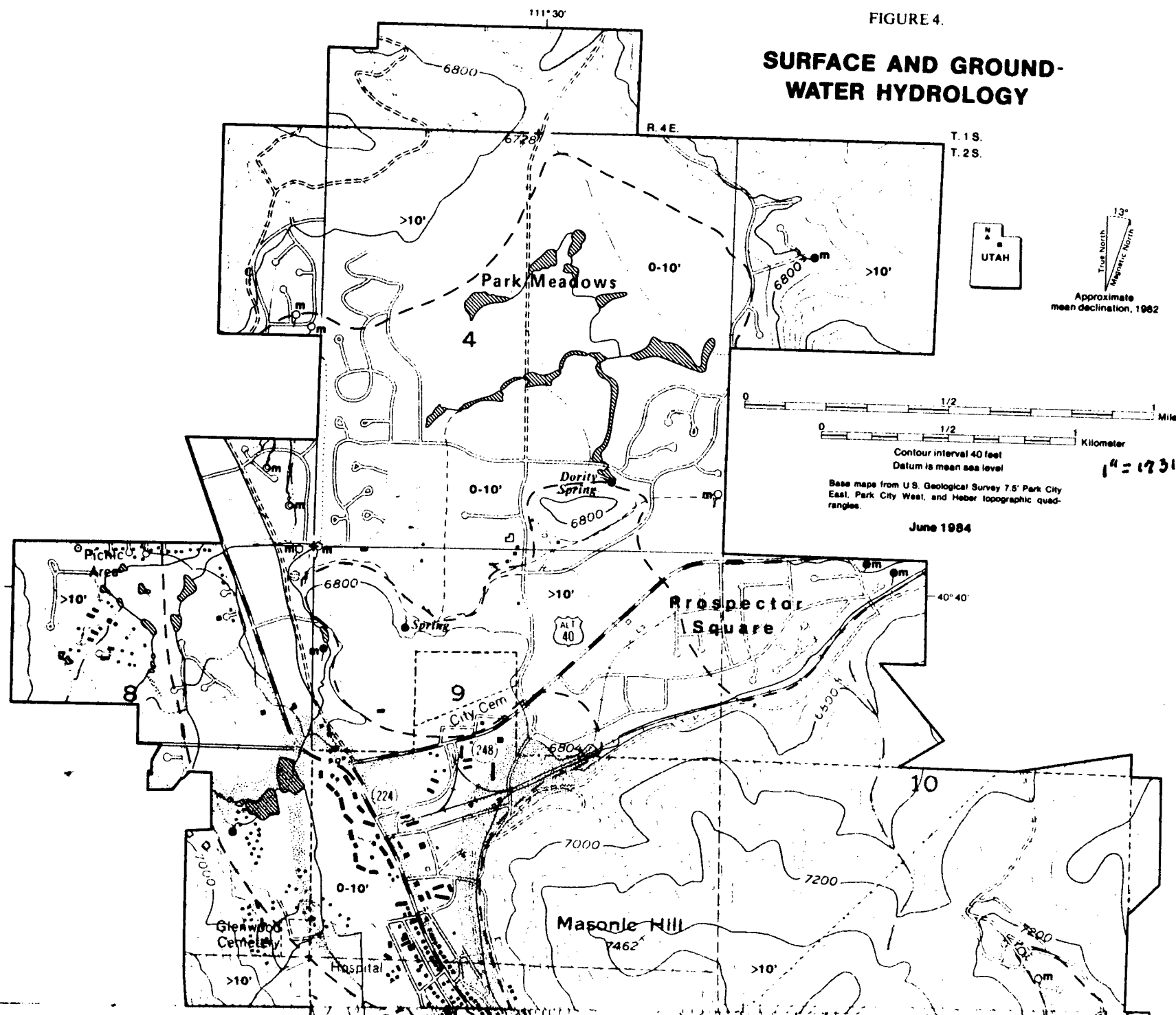
**Portions of Park City are characterized by steep**

## Previous work

Since the discovery of silver in the late 1800s, the Park City area has been of interest to geologists. Boutwell (1912) published the first extensive geologic study of the Park City mining district and it remains the standard reference for the area. Published reports by Wilson (1959), Eardley (1968), and Bromfield (1968) also discuss the geology of the Park City mining district. The U.S. Geological Survey has mapped the geology of the Park City East and West and Heber 7.5 minute topographic quadrangles, portions of which cover the study area (Bromfield and others, 1970, 1971; Crittenden and others, 1966). A great deal of geologic and hydrologic information has been gathered by various mining companies, but these data are available only through a contract/fee arrangement with United Park City Mines. Baker (1970) published the only hydrologic report pertaining to the study area. The U.S. Geological Survey is currently studying surface and ground-water hydrology in the Park City area, but the report will not be complete for several years. A map of flood-prone areas in Park City has been prepared by the U.S. Department of Housing and Urban Development Federal Insurance Administration (1976) which shows the extent of the 100-year flood (flood with a one percent chance of occurring annually) on major streams. A more comprehensive study, including newly developed areas, is scheduled to begin during the summer of 1984, with completion in about 18 months (James Harvey, Soil Conservation Service). The USDA Soil Conservation Service and others (1981) have mapped soils in the area and have made maps

FIGURE 4.

# **SURFACE AND GROUND- WATER HYDROLOGY**



## EXPLANATION

This map depicts surface hydrology, flood hazard, and estimated seasonal high stand of the shallow water table in Park City. Streams were monitored from late March through August 1963 to differentiate base flow from runoff, and flood conditions were observed from late March through mid-July. The observations were incorporated with data from the 1976 U. S. Department of Housing and Urban Development Federal Insurance Administration map, which outlines the extent of a 100-year flood (flood with a one percent chance of occurring annually) on major streams. Field observations during 1963, and analysis of data from boring logs and test pits covering a ten-year period (1972-1982), allowed identification of shallow (0-10 feet) ground-water areas. The 1982-1983 water year (October 1 through September 1) is the wettest on record for Utah; conditions shown on this map may not be encountered in a normal year but can be reasonably expected to recur.

Extensive flood damage occurred in Empire Canyon where the creek overflowed its banks and inundated nearby structures. The bridge over Silver Creek (Pulson Creek) at Heber Avenue was also damaged, and a thick layer of debris was deposited on the road. The flooding observed during the monitoring period is considered exceptional for Park City, and resulted from the rapid melt of an exceptionally heavy snowpack.

Shallow ground water has affected construction in the study area. However, most problems have been mitigated by: (a) installation of underground drains, (b) utilization of underground space for parking drains rather than living quarters, (c) construction of basins without basements, or with spill-level drains, and (d) use of seasonally flooded areas as recreational sites (i.e. a golf course).

Basements and other underground facilities may become flooded in recognized high ground-water areas. Flood hazard and depth to shallow ground water should be determined by site investigations prior to construction.

Perennial spring or seep, m denotes area of marshy or boggy ground

Intermittent spring or seep, m denotes area of marshy or boggy ground

Perennial stream, dotted where piped

Intermittent stream, dotted where piped

Irrigation ditch or canal

$\frac{>10'}{0-10'}$

Approximate contact between high ground-water areas (0-10 feet) and areas where depth to ground water is greater than 10 feet; intermittent springs and seeps may occur in both areas



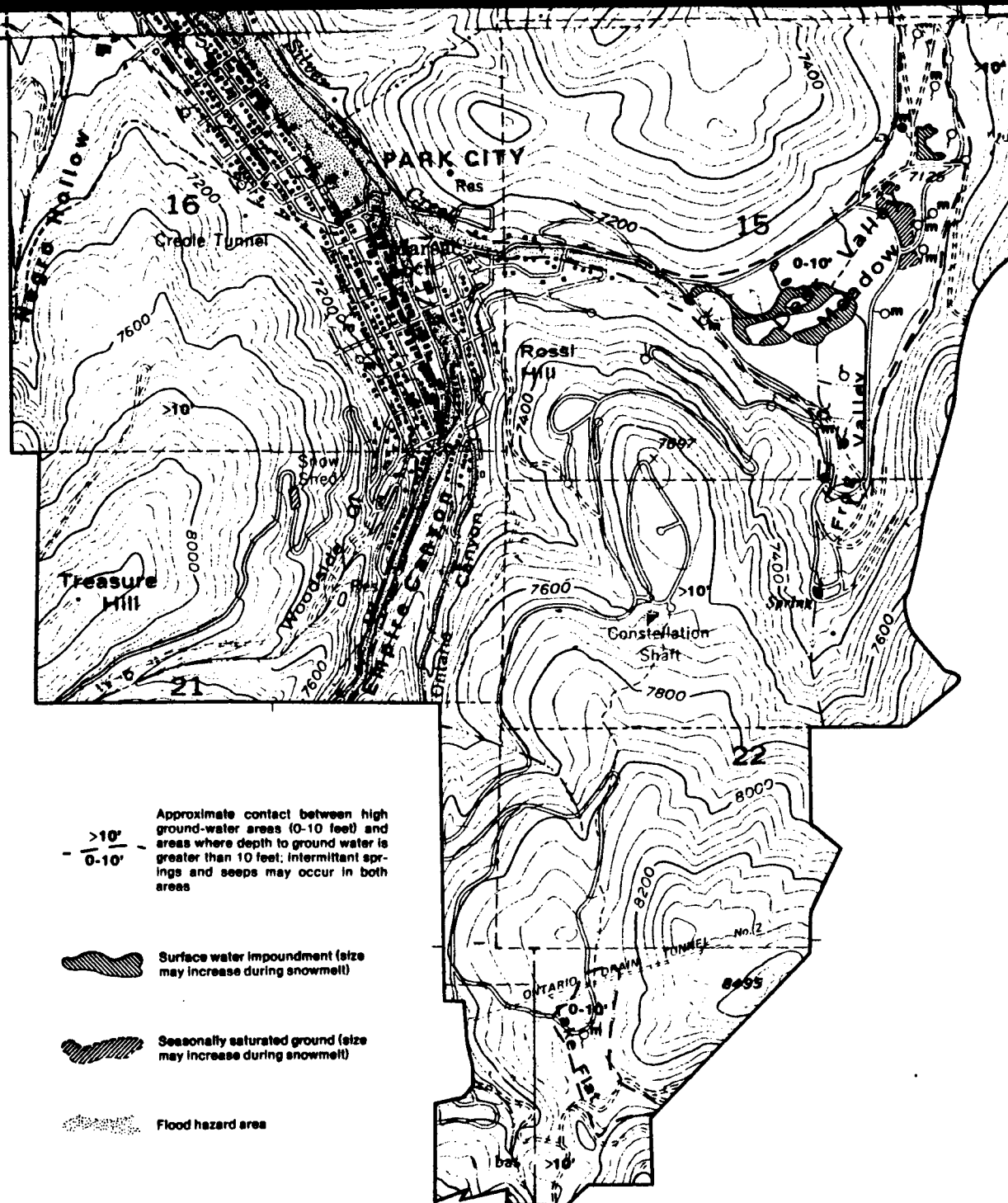
Surface water impoundment (size may increase during snowmelt)



Seasonally saturated ground (size may increase during snowmelt)



Flood hazard area



### Soils

Soils in the area range from relatively thin colluvial gravel usually found on or at the base of mountain slopes to thick, fine-grained alluvial soil generally restricted to valley bottoms. The soil units identified by the USDA Soil Conservation Service and others (1977) in Park City have been modified based on geologic mapping, air photo interpretation, and boring/test pit logs. They have been combined on the basis of soil type and engineering characteristics into four major groups (fig. 3). The groups are further subdivided into deep and shallow soils based on a depth to bedrock of 60 inches (152 cm). The major soil groups consist of (a) gravel, silty gravel, and clayey gravel (Group I), (b) silty clay and clay (Group II), (c) a mixture of clay, silt, and gravel (Group III), and (d) a layer of silty clay overlying silty and clayey gravel (Group IV). An "r" attached to the group number designates an area of shallow bedrock (e.g. Ir). Soil descriptions conform to the Unified Soil Classification System (table 1).

Gravelly soils consist primarily of silty, clayey, and sandy gravels (GM, GC, GP). Silty and clayey gravels have permeabilities ranging from 0.6 to 6.0 inches/hour ( $4.2 \times 10^{-4}$  to  $4.2 \times 10^{-3}$  cm/sec), while clean gravels can have permeabilities as high as 20 inches/hour ( $1.4 \times 10^{-2}$  cm/sec). Fines forming the matrix for the clayey gravels exhibit low to moderate shrink-swell characteristics and may have low shear strengths (USDA Soil Conservation Service and others, 1977). Gravelly soils occur on or near the base of mountain slopes or as clean sandy gravel in stream channels.

Fine-grained soils consist of silt and clay (ML, CL, CH). These soils have permeabilities of 0.06 to 2.0 inches/hour ( $4.2 \times 10^{-5}$  to  $1.4 \times 10^{-3}$  cm/sec), low to high shrink-swell characteristics, and low shear strength (USDA Soil Conservation Service and others, 1977). Fine-grained soils are found primarily in valley bottoms and along some stream channels where they represent overbank flood deposits.

Both gravelly and fine-grained materials have developed as residual soils over bedrock. Resistant formations such as the Weber Quartzite and the limestone of the Park City Formation generally have only a thin residual soil cover. Less resistant rock units in the northern half of the study area develop variable thicknesses of residual soil depending on rock type and slope. The Woodside Shale and Ankareh Formation have the deepest residual soils, commonly up to several feet thick. Soil texture (grain size) depends on the rock type from which the soil is derived. Residual soil on quartzite will be sandy or gravelly.

TABLE 1.—Unified Soil Classification System.

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS 50% or more passes No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
		OL	Organic silts and organic silty clays of low plasticity	
	SILTS AND CLAYS Liquid limit greater than 50%	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts	
		CH	Inorganic clays of high plasticity, fat clays	
		OH	Organic clays of medium to high plasticity	
	HIGHLY ORGANIC SOILS			PT

\*Based on the National Building and Fire Research Institute.

BORING LOGS  
Prospector Square Area, Park City, Utah



Soil Description\*

Boring No. 1

- 0.0' - 2.0' Silty sand with clay (SM); possible tailings, dark brown, low density, nonplastic to low plasticity, nonindurated, moist.
- 2.0' - 4.0' Silty clay (CL); possible tailings, dark brown, soft, medium plastic, nonindurated, moist.
- 4.0' - 5.0' Clayey sand (SC); possible tailings, dark brown, low density, low to medium plasticity, nonindurated, moist; tried four different locations and could not get below 5' due to a gravel-cobble horizon, which is natural material.

Note: Ground water not encountered.

Boring No. 2

- 0.0' - 4.0' Silty sand (SM); tailings, brown, loose, nonplastic, nonindurated, moist to dry; could not go below 4.0' due to gravel-cobble horizon (natural material). Sample taken and chemical analysis run.

Note: Ground water not encountered.

Boring No. 2a

- 0.0' - 1.0' Silty sand (SM); tailings, light brown, loose, nonplastic to low plasticity, nonindurated, moist to dry.
- 1.0' - 3.0' Silty sand - silty gravel (SM-GM); tailings, brown, loose, nonplastic, nonindurated, dry to moist.
- 3.0' - 5.0' Gravel (GP); possible natural soil, brown, loose, nonplastic, nonindurated, dry; could not go deeper than 5.0' due to cobble-gravel horizon (natural material). Sample taken at this location.

Note: Ground water not encountered.

\*Soil descriptions conform to ASTM Standard D 2488-69. All grain size percentages are field estimates.

Boring No. 3

- 0.0' - 1.5' Clayey sand - sandy clay (SC-CL); tailings, dark brown, loose, low plasticity, nonindurated, moist.
- 1.5' - 3.5' Silty clay (CL); tailings, yellow brown, firm, medium plasticity, nonindurated, moist.
- 3.5' - 6.0' Clayey gravel (GC); tailings, brown, loose, low to no plasticity, nonindurated, moist; could not go deeper than 6.0' due to gravel-cobble horizon (natural material). Sample taken.

Note: Ground water not encountered.

Boring No. 4

- 0.0' - 2.5' Sand (SP); tailings, brown, loose, nonplastic, nonindurated, moist.
- 2.5' - 4.5' Clay (CH); tailings, dark brown, stiff to very stiff, high plasticity, nonindurated, moist.
- 4.5' - 5.5' Silty clay (CL); tailings, brown, firm to stiff, medium to high plasticity, nonindurated, moist; could not go below 5.5' due to gravel-cobble horizon (natural material). Sample taken and chemical analysis run.

Note: Ground water not encountered.

Boring No. 5

- 0.0' - 2.0' Sand - Silty sand (SP-SM); tailings, light brown, loose, nonplastic, nonindurated, moist.
- 2.0' - 5.0' Sand (SP); tailings, light brown, loose, nonplastic, nonindurated, moist.
- 5.0' - 10.0' Sandy clay (CL); tailings, black, soft, medium plasticity, nonindurated, wet to saturated.
- 10.0' - 11.0' Silty clay (CL); tailings, dark brown, soft, low plasticity, nonindurated, wet to saturated; could not go below 11.0' due to gravel-cobble horizon (natural material). Sample taken and chemical analysis run.

Note: Standing ground water not encountered. however, soil moisture conditions suggest the ground-water level is probably between 11 and 13 feet.

Boring No. 6

- 0.0' - 1.0' Sand (SP); tailings, light brown, loose, nonplastic, nonindurated, moist.
- 1.0' - 9.0' Silty clay (CL); tailings, dark brown, soft to firm, medium plasticity, nonindurated, wet to saturated; could not go below 9.0' due to gravel-cobble horizon (natural material). Sample taken and chemical analysis run.

Note: Boring caved before water reading could be taken. Auger stem was wet at 7.5' which would place the water level at approximately 8 to 9 feet below the surface.

Boring No. 7

- 0.0' - 2.5' Silty sand (SM); fill material (wood chips); brown, loose, none to low plasticity, nonindurated, moist.
- 2.5' - 4.0' Silty sand - silty gravel (SM-GM); tailings, brown, loose, nonplastic, nonindurated, moist.
- 4.0' - 7.5' Silty clay (CL); tailings, black, soft, low to medium plasticity, nonindurated, moist.
- 7.5' - 9.0' Clayey gravel (GC); tailings, brown, low density, none to low plasticity, nonindurated, moist; could not go below 9.0' due to gravel-cobble horizon (natural material). Sample taken.

Note: Ground water not encountered.

Boring No. 8

- 0.0' - 2.5' Silty sand - silty gravel (SM-GM); natural material, brown, loose, nonplastic, nonindurated, moist; .

Note: Ground water not encountered.

Boring No. 9

- 0.0' - 7.0' Silty sand with gravel (SM); natural material, brown loose, nonplastic, nonindurated, moist; .

Note: Ground water not encountered.

### Yorktown Excavation

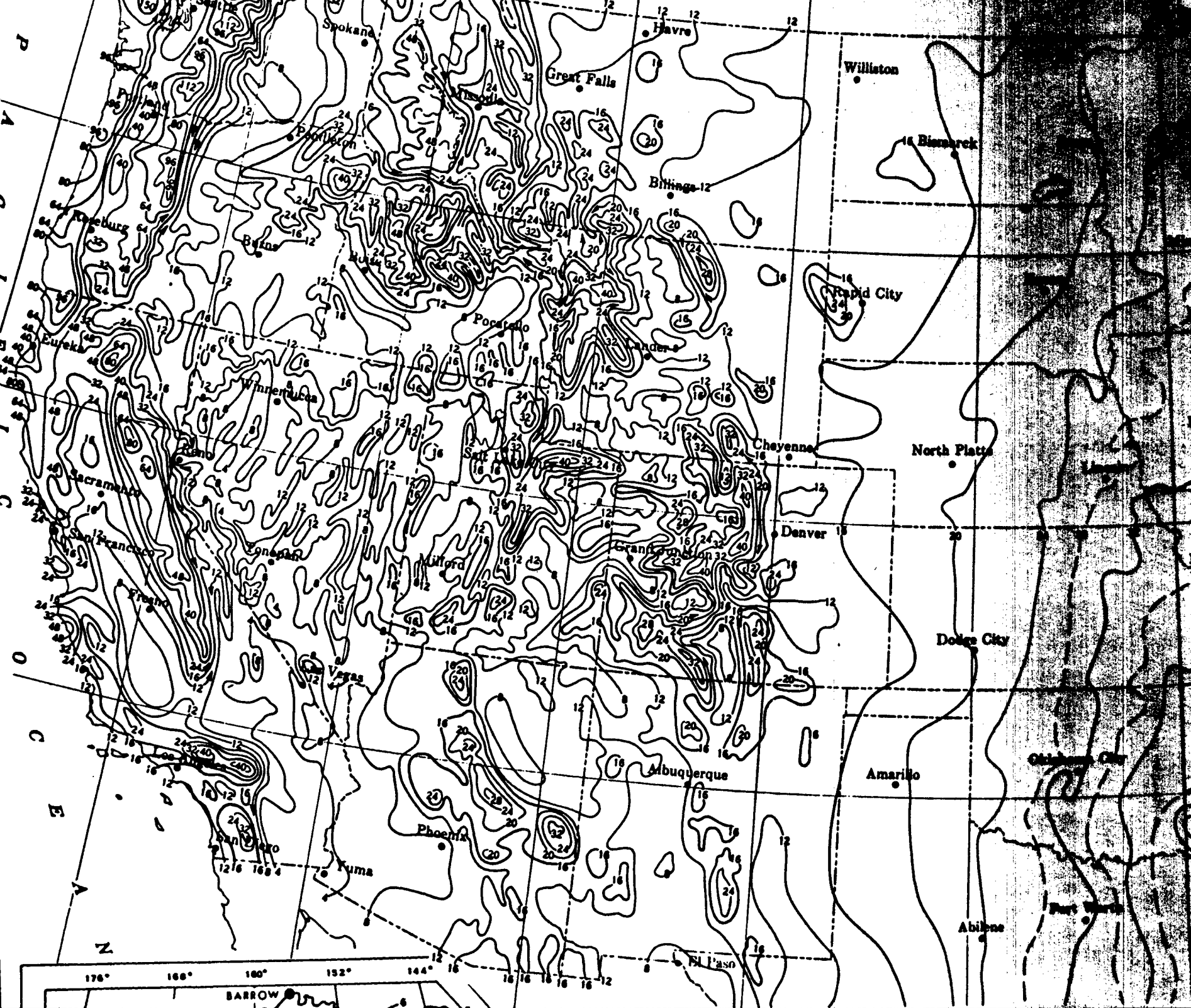
- 0.0' - 0.6' Sand (SP); tailings, light brown, medium dense, nonplastic, weakly to moderately indurated, dry.
- 0.6' - 2.0' Sand with gravel (SP); tailings, light brown, medium dense, nonplastic, weakly to moderately indurated, dry.
- 2.0' - 4.0' Silty clay (CL); tailings, brown, firm, medium plasticity, weakly to moderately indurated, dry.
- 4.0' - 10.0' Cobbly gravel (GP); natural soil, brown, medium dense, nonplastic, weakly to moderately indurated, dry; this is the natural material that stopped the drilling in all of the borings, approximately 20% cobbles and 40% gravel. Sample taken and chemical analysis run.

Note: Ground water not encountered.

REF #5

Mean Annual Precipitation (inches)

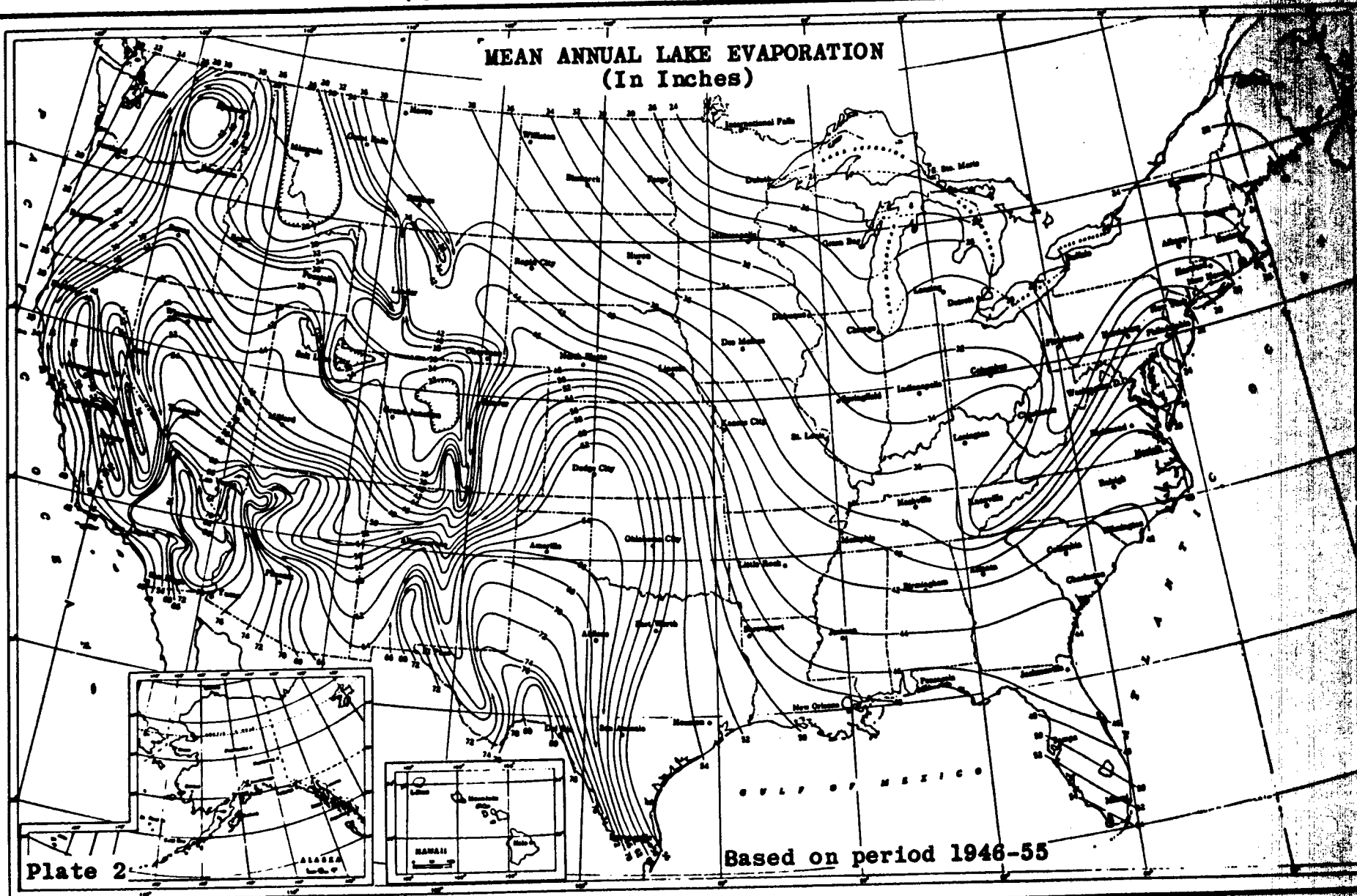
from: Climatic Atlas of the United States, U.S. Dept Commerce, Environmental Science Services & Administration, Environmental Data Service, June 3, 1968



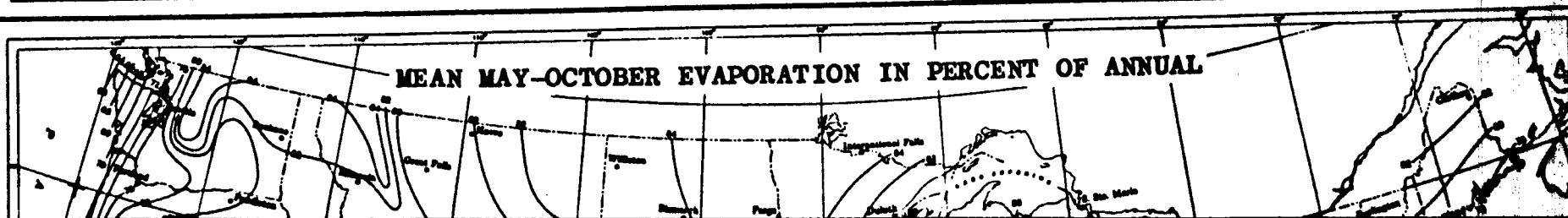
# LAKE EVAPORATION

from: Climatic Atlas of the United States  
U.S. Dept. of Commerce, Environmental Science Services  
Administration Environmental Data Service, June, 1968

## MEAN ANNUAL LAKE EVAPORATION (In Inches)



## MEAN MAY-OCTOBER EVAPORATION IN PERCENT OF ANNUAL



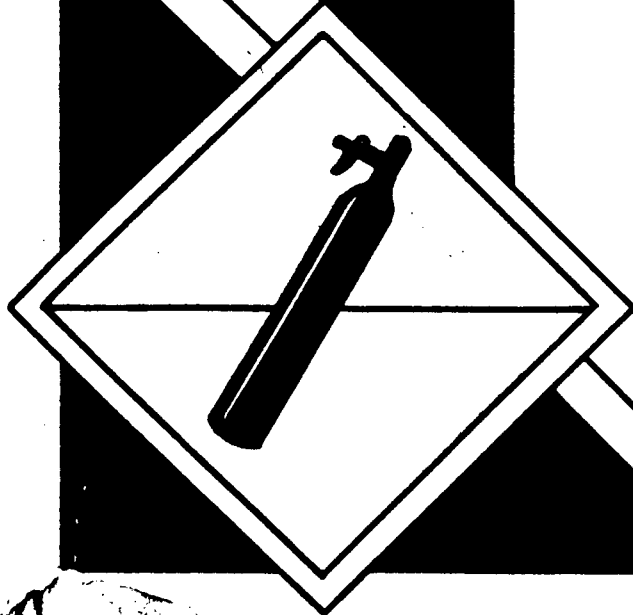
REF #8

8

# Dangerous Properties of Industrial Materials

Fifth Edition

N. Irving Sax



will explode it; when heated, emits highly toxic fumes of lead.

**LEAD BENZOATE.** White crystals.  $\text{Pb}(\text{C}_7\text{H}_5\text{O}_2)_2 \cdot \text{H}_2\text{O}$ , mw: 467.5, mp:  $-\text{H}_2\text{O}$  @  $100^\circ$ .

THR = See lead compounds and lead.

**LEAD-*m*-BORATE.** White powder.  $\text{Pb}(\text{BO}_2)_2 \cdot \text{H}_2\text{O}$ , mw: 310.87, d: 5.598 (anhydrous).

THR = See lead and boron compounds. A poison.

**LEAD BROMATE.** Monoclinic crystals.  $\text{Pb}(\text{BrO}_3)_2 \cdot \text{H}_2\text{O}$ , mw: 481.06, mp:  $180^\circ$  (decomp), d: 5.53.

THR = See lead compounds and bromates. A poison.

**LEAD BUTYRATE.**  $\text{C}_8\text{H}_{14}\text{O}_4\text{Pb}$ , mw: 381.4.

THR = A poison. See also lead compounds.

**LEAD CAPRATE.**  $\text{Pb}(\text{C}_{10}\text{H}_{19}\text{O}_2)_2$ , mw: 549.71, mp:  $103^\circ$ – $104^\circ$ .

THR = See lead compounds and lead.

**LEAD CAPROATE.** Crystals.  $\text{Pb}(\text{C}_6\text{H}_{11}\text{O}_2)_2$ , mw: 437.51, mp:  $73^\circ$ – $74^\circ$ .

THR = See lead compounds and lead.

**LEAD CAPRYLATE.** White leaf.  $\text{Pb}(\text{C}_8\text{H}_{15}\text{O}_2)_2$ , mw: 493.61, mp:  $83.5^\circ$ – $84.5^\circ$ .

THR = See lead compounds and lead.

**LEAD CARBONATE.** Syn: *cerussite*. White powdery crystals.  $\text{PbCO}_3$ , mw: 267.22, mp: decomp @  $315^\circ$ , d: 6.61.

THR = An exper ( $\pm$ ) carc. [3, 9] A poison. Violent reaction with  $\text{F}_2$ . [19] See lead compounds and lead.

**LEAD CARBONATE, BASIC.** Syn: *white lead*, *hydrocerussite*. White powder, amorphous.

$2\text{PbCO}_3\text{Pb}(\text{OH})_2$ , mw: 775.67, mp: decomp @  $400^\circ$ , d: 6.14.

THR = See lead compounds and lead. A poison. Violent reaction with  $\text{F}_2$ . [19]

**LEAD CEROTATE.** White crystals.  $\text{Pb}(\text{C}_{26}\text{H}_{51}\text{O}_2)_2$ , mw: 998.55, mp:  $113.5^\circ$ .

THR = See lead compounds and lead.

**LEAD CHLORATE.** Monoclinic white crystals.

$\text{Pb}(\text{ClO}_3)_2$ , mw: 374.12, mp: decomp. d: 3.89.

THR = See lead compounds, chlorates and lead. A poison. Reacts violently with S. [19]

**LEAD CHLORIDE.** Syn: *cotunnite*. White crystals,  $\text{PbCl}_2$ , mw: 278.1, mp:  $501^\circ$ , bp:  $954^\circ$ , d: 5.85, vap. press: 1 mm @  $547^\circ$ .

THR = See lead compounds. A poison. An exper teratogen. [3]

**LEAD CHLORITE.** Monoclinic yellow crystals.

$\text{Pb}(\text{ClO}_2)_2$ , mw: 342.12, mp: explodes @  $126^\circ$ .

THR = See lead compounds and chlorites. Reacts violently with S. [19]

**LEAD CHROMATE.** Syn: *crocoite*, *chrome yellow*. Yellow crystals.  $\text{PbCrO}_4$ , mw: 323.22, mp:  $844^\circ$  bp: decomp, d: 6.3.

Acute tox data: ip  $\text{LD}_{50}$  (guinea pig) = 400 mg/kg. [1]

THR = HIGH via ip route. An exper ( $\pm$ ) neo and carc [3, 6] Reacts violently with ferric ferrocyanide. [1]

**LEAD CHROMATE, BASIC.** Red, amorphous or crystals.  $\text{Pb}_2(\text{OH})_2 \cdot \text{CrO}_4$ , mw: 564.45, mp:  $920^\circ$ .

THR = See lead and chromium compounds. A exper neo. [3]

**LEAD CITRATE.** White crystalline powder.

$\text{Pb}_3(\text{C}_6\text{H}_5\text{O}_7)_2 \cdot 3\text{H}_2\text{O}$ , mw: 1053.88.

THR = See lead compounds.

## LEAD COMPOUNDS.

THR = Poisons. Lead poisoning is one of the commonest of occupational diseases. The presence of lead-bearing materials or lead compounds in an industrial plant does not necessarily result in exposure on the part of the workman. The lead must be in such form, and so distributed, as to gain entrance into the body or tissues of the workman in measurable quantity, otherwise no exposure can be said to exist. Some are exper (+) carc of the lungs and kidneys. [14, 23, 9, 95]

Mode of entry into body:

1. By inhal of the dusts, fumes, mists or vapors. (Common air contaminants.)
2. By ingestion of lead compounds trapped in the upper respiratory tract or introduced into the mouth on food, tobacco, fingers or other objects.
3. Through the skin; this route is of special importance in the case of organic compounds of lead, as lead tetraethyl. In the case of the inorganic forms of lead, this route is of no practical importance.

When lead is ingested, much of it passes through the body unabsorbed, and is eliminated in the feces. The greater portion of the lead that is absorbed is caught by the liver and excreted, in part, in the bile. For this reason, larger amounts of lead are necessary to cause poisoning if absorption is by this route, and a longer period of exposure is usually necessary to produce symptoms. On the other hand, upon inhal, absorption takes place easily from the respiratory tract and symptoms tend to develop more quickly. From the point of view of industrial poisoning, inhal of lead is much more important than is ingestion.

Lead is a cumulative poison. Increasing amounts build up in the body and eventually a point is reached where symptoms and disability occur. Lead produces a brittleness of the red blood cells so that they hemolyze with but slight trauma; the hemoglobin is not affected. Due to their increased fragility, the red cells

are destroyed more rapidly in the body than normally, producing an anemia which is rarely severe. The loss of circulating red cells stimulates the production of new young cells which, on entering the blood stream, are acted upon by the circulating lead, with resultant coagulation of their basophilic material. These cells after suitable staining, are recognized as "stippled cells." As regards the effect of lead on the white blood cells, there is no uniformity of opinion. In addition to its effect on the red cells of the blood, lead produces a damaging effect on the organs or tissues with which it comes in contact. No specific or characteristic lesion is produced. Autopsies of deaths attributed to lead poisoning and experimental work on animals, have shown pathological lesions of the kidneys, liver, male gonads, nervous system, blood vessels and other tissues. None of these changes, however, have been found consistently.

In cases of lead poisoning, the amount of lead found in the blood is frequently in excess of 0.07 mg per 100 cc of whole blood. The urinary lead excretion generally exceeds 0.1 mg per liter of urine.

The toxicity of the various lead compounds appears to depend upon several factors: (1) the sol of the compound in the body fluids; (2) the fineness of the particles of the compound; sol is greater, of course, in proportion to the fineness of the particles; (3) conditions under which the compound is being used; where a lead compound is used as a powder; contamination of the atmosphere will be much less where the powder is kept damp. Of the various lead compounds, the carbonate, the monoxide and sulfate are considered to be more toxic than metallic lead or other lead compounds. Lead arsenate is very toxic, due to the presence of the arsenic radical.

**Signs and Symptoms:** Industrial lead poisoning commonly occurs following prolonged exposure to lead or its compounds. The common clinical types of lead poisoning may be classified according to their clinical picture as (a) alimentary; (b) neuromotor; and (c) encephalic. Some cases may show a combination of clinical types. The alimentary type occurs most frequently, and is characterized by abdominal discomfort or pain. Severe cases may present actual colic. Other complaints are constipation and/or diarrhea, loss of appetite, metallic taste, nausea and vomiting, lassitude, insomnia, weakness, joint and muscle pains, irritability, headache and dizziness. Pallor, lead line on the gums, pyorrhea, loss of weight, abdominal tenderness, basophilic stippling, anemia, slight albuminuria, increased urinary excretion, and an increase in the lead content of the whole blood, are signs which may accompany the above symptoms.

In the neuromuscular type, the chief complaint is weakness, frequently of the extensor muscles of the wrist and hand, unilateral or bilateral. Other muscle groups which are subject to constant use may be affected. Gastroenteric symptoms are usually present, but are not as severe as in the alimentary type of poisoning. Joint and muscle pains are likely to be more severe. Headache, dizziness and insomnia are frequently prominent. True paralysis is uncommon, and usually is the result of prolonged exposure.

Lead encephalopathy is the most severe but the rarest manifestation of lead poisoning. In the industrial worker it follows rapid and heavy lead absorption. Organic lead compounds, such as tetraethyl lead, are absorbed rapidly through the skin as well as through the lungs, and are selectively absorbed by the CNS. The clinical picture in these cases is usually an encephalopathy. With inorganic lead compounds, comparable conc in the CNS are reached only when the workplace is heavily contaminated with vapor, fume and dust. Encephalopathy begins abruptly, and is characterized by signs of cerebral and meningeal involvement. There is usually stupor, progressing to coma, with or without convulsion, and often terminating in death. Excitation, confusion and mania are less common. In milder cases of short duration, there may be symptoms of headache, dizziness, somnolence and insomnia. The cerebrospinal pressure may be increased. See also specific compound.

**Diagnosis:** A diagnosis of lead poisoning should not be made on the basis of any single clinical or laboratory finding. There must be a history of significant exposure, signs, and symptoms (as described above) compatible with the diagnosis, and confirmatory laboratory tests. Increase of stippled red blood cells, mild anemia, and elevated lead in blood and urine, i.e., more than 0.07 mg/100 ml blood and similar values per liter of urine. An increase of coproporphyrins and certain amino acids in urine may be present. Diagnostic mobilization of lead with calcium EDTA may be useful in questionable cases.

**Treatment of Lead Poisoning:** It has been found that the chelating agent, calcium ethylenediaminetetracetate, and related compounds are highly efficacious in removing absorbed lead from the tissues of the body. (The therapeutic agents of this group are also known as versene, versenate, edathamil and Ca EDTA. Ca EDTA is effective only when administered intravenously. Various dosage schedules have been proposed. An effective regime is 3-6 g of Na Ca EDTA in 300 cc-500 cc of 5% glucose by intravenous drip over a period of 3-8 hrs. Treatment may

REF-4

Fred Duberow  
J.J. Johnson & Assoc.  
(801) 649-9811



STATE OF UTAH  
DEPARTMENT OF HEALTH

TIM A. PINE, P.E.  
Public Health Engineer  
Bureau of Public Water Supplies  
Division of Environmental Health

560 S. 300 E. Salt Lake City, UT 84111 - 801-533-4207

# PARK CITY WATER RESOURCES STUDY

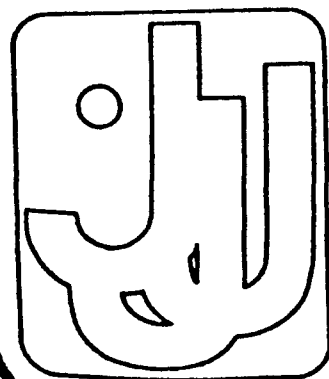
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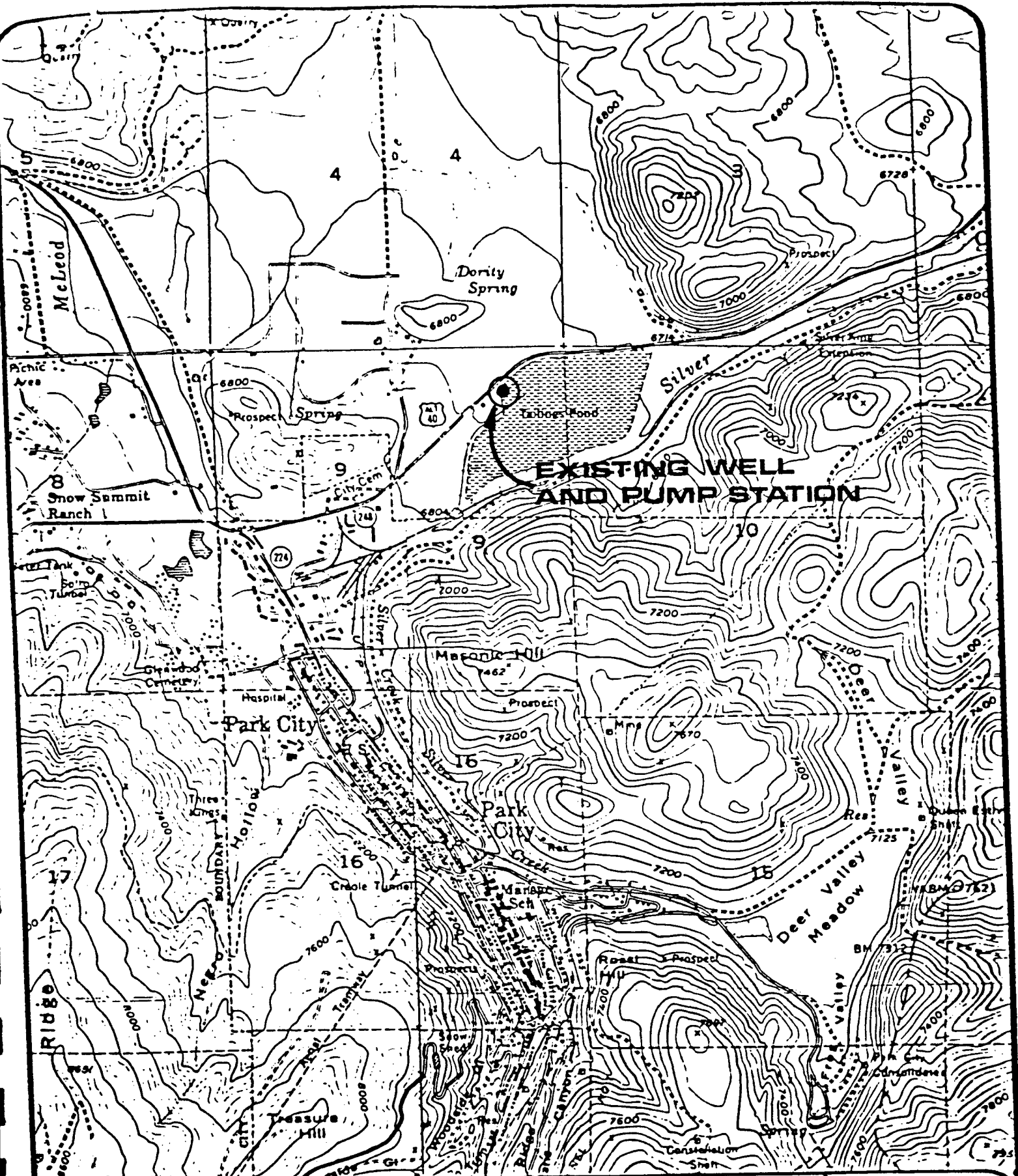
NOVEMBER 1982

FOR  
PARK CITY MUNICIPAL CORPORATION

J.J. Johnson & Associates

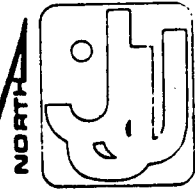
Civil Engineering  
Land Planning  
Surveying





**PACIFIC BRIDGE  
WELL  
LOCATION MAP**

0 1000 2000



**FIGURE  
12**

Recent chemical water quality analyses are included in this study (Figures 9 and 10, Section X), as well as previous similar reports on the spring water. Important bacteriological tests were recently performed and these results are included in Figure 11.

The Theriot Spring pumphouse source is presently considered a dependable fresh water source with a maximum flow rate of 2.67 cfs (1,200 gpm). This flow rate can vary. The Public Works Department does consider 900 gpm as an accurate year-round capacity.

Care should be taken to assure that the chlorination facility is adequate to disinfect flows up to 2.67 cfs (1,200 gpm). All improvements to this source, and all water sources in Park City, must be formally approved by the Utah State Department of Health, Bureau of Public Water Supply (see Appendix A-5).

#### D. Pacific Bridge Well

A fourth water source currently available to Park City is the deep well located across from the new Park City High School and immediately south of State Highway 248 (see Figure 12, Section X).

The Pacific Bridge Company originally had the well drilled in 1948, and pump tested it at 0.62 cfs (280 gpm). The results of the well driller's report are included in this study as Figure 13. In 1977, a formal well pump test developed a flow rate of 0.59 cfs (263 gpm) with 259 feet of drawdown. The test pump was set at a depth of about 300 feet. Figure 16 indicates the results of that test. Chemical analyses of the well water were performed in 1974 and 1980, and are included as Figures 14 and 15.



POTENTIAL HAZARDOUS SITE  
PRELIMINARY ASSESSMENT  
PART 1 - SITE INFORMATION AND ASSESSMENT

L IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site) Prospector Square		02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER			
03 CITY Park City	04 STATE UT	05 ZIP CODE 84060	06 COUNTY Summit	07 COUNTY CODE 043	08 CONG DIST 3
09 COORDINATES LATITUDE 4 0° 3 9' 3 3" N		LONGITUDE 1 1 1° 3 0' 0 0" W		Approx taken off topo map	

10 DIRECTIONS TO SITE (Starting from nearest public road)

Park City is approx 30 miles east of Salt Lake City. Take Interstate 80 east from Salt Lake City for approx 22 miles, turn south on Park City Exit, approx 8 miles to town. Site is located on northside of Alt 40.

III. RESPONSIBLE PARTIES

01 OWNER (if known) Multiple Owners		02 STREET (Business, mailing, residential)			
03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER ( )		
07 OPERATOR (if known and different from owner) -NONE-		08 STREET (Business, mailing, residential)			
09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER ( )		

13 TYPE OF OWNERSHIP (Check one)

☒ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL  
☐ F. OTHER: ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply) \*

☐ A. RCRA 3001 DATE RECEIVED: / / ☐ B. UNCONTROLLED WASTE SITE/CERCLA 103 ii DATE RECEIVED: / / ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION <input checked="" type="checkbox"/> YES DATE: / / <input type="checkbox"/> NO MONTH DAY YEAR		02 BY (Check all that apply) <input type="checkbox"/> A. EPA <input type="checkbox"/> B. EPA CONTRACTOR <input type="checkbox"/> C. STATE <input type="checkbox"/> D. OTHER CONTRACTOR <input type="checkbox"/> E. LOCAL HEALTH OFFICIAL <input type="checkbox"/> F. OTHER: CONTRACTOR NAME(S):			
03 SITE STATUS (Check one) <input type="checkbox"/> A. ACTIVE <input checked="" type="checkbox"/> B. INACTIVE <input type="checkbox"/> C. UNKNOWN		04 YEARS OF OPERATION BEGINNING YEAR ENDING YEAR <input checked="" type="checkbox"/> UNKNOWN			

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Prospector Square is built on an old tailings dump. Analysis work by State lab shows total metal concentrations of tailings: arsenic 400 ppm, cadmium 89 ppm, lead 4,000 ppm and silver 70 ppm. Both Cadmium and lead failed EP TOX Test with Cadmium at 1.8 ppm and lead at 68 ppm.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Potential exists for lead, cadmium, and possibly other heavy metals to contaminate surface water and/or groundwater near the site. Houses and businesses are located on top of tailing so there exists a high potential for direct contact with tailings.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one, if higher medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Impacts)

☒ A. HIGH ☐ B. MEDIUM ☐ C. LOW ☐ D. NONE

VI. INFORMATION AVAILABLE FROM

01 CONTACT Donald G. Verbica	02 OF (Agency/Organization) Utah State Department of Health/Bureau of Solid and Hazardous Waste		03 TELEPHONE NUMBER (801) 533-4145
04 PERSON RESPONSIBLE FOR ASSESSMENT Dale Parker, PH.D.	05 AGENCY USHD	06 ORGANIZATION UBSHW	07 TELEPHONE NUMBER (801) 533-4145
08 DATE 01 31 83 MONTH DAY YEAR			

\* Prospector Square didn't notify under either CERCLA or RCRA (They were unaware of any potential problem.)



POTENTIAL HAZARDOUS WASTE SITE  
PRELIMINARY ASSESSMENT  
PART 2 - WASTE INFORMATION

I IDENTIFICATION

01 STATE 02 SITE NUMBER

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☒ A. SOLID  
☐ B. POWDER, FINES  
☐ C. SLUDGE  
☐ D. OTHER \_\_\_\_\_  
☐ E. SLURRY  
☐ F. LIQUID  
☐ G. GAS

02 WASTE QUANTITY AT SITE

(Percentage of waste estimated must be indicated)

TONS 7,000,000\*

CUBIC YARDS 700,000,000

NO. OF DRUMS 4/20/84

03 WASTE CHARACTERISTICS (Check all that apply)

- ☒ A. TOXIC  
☐ B. CORROSIVE  
☐ C. RADIOACTIVE  
☐ D. PERSISTENT  
☐ E. SOLUBLE  
☐ F. INFECTIOUS  
☐ G. FLAMMABLE  
☐ H. IGNITABLE  
☐ I. HIGHLY VOLATILE  
☐ J. EXPLOSIVE  
☐ K. REACTIVE  
☐ L. INCOMPATIBLE  
☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OLY WASTE			
SOL	SOLVENTS			
PSO	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	unknown		metals in tailings

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently used CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURED CONCENTRATION
	- tailings - N.O.S.	999	OD (see analysis)		
IOC	arsenic N.O.S.	999	total metals concentration	400	ppm
MES	cadmium N.O.S.	999	total metals concentration	89	ppm
MES	- chromium N.O.S.	999	total metals concentration	17	ppm
MES	copper N.O.S.	999	total metals concentration	900	ppm
MES	lead N.O.S.	999	total metals concentration	4000	ppm
MES	manganese N.O.S.	999	total metals concentration	2100	ppm
MES	- mercury N.O.S.	999	total metals concentration	3.9	ppm
MES	- selenium N.O.S.	999	total metals concentration	2	ppm
MES	silver N.O.S.	999	total metals concentration	55	ppm
	- tailings - N.O.S.		OD (see analysis)		
MES	- cadmium N.O.S.	999	EP toxicity	1.8	ppm
MES	- lead N.O.S.	999	EP toxicity	68	ppm

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., State test, sample analysis, reports)

Lab analysis # HW 83089 (For Total Metals), # HW 83089 (same number but this one was EP Toxicity), HW 83090 (For EP Toxicity)

\* Quantity based on 80 acres 4 feet deep



POTENTIAL HAZARDOUS WASTE SITE  
PRELIMINARY ASSESSMENT

1 IDENTIFICATION	
01 STATE	02 SITE NUMBER

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

3.1 HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION  
03 POPULATION POTENTIALLY AFFECTED: 7 to 10,000\*\* 02 ☒ OBSERVED (DATE: \_\_\_\_\_) ☒ POTENTIAL ☐ ALLEGED  
04 NARRATIVE DESCRIPTION within a 3 mile radius  
Potential exists for contamination of groundwater. The tailings lie next to Silver Creek and sit on top of old stream sediments (sands and clays). The water table is relatively high due to Silver Creek. The tailings are porous and could be leached, the resulting leachate could migrate into the groundwater.

01 ☒ B. SURFACE WATER CONTAMINATION  
03 POPULATION POTENTIALLY AFFECTED: 7 to 10,000\*\* 02 ☒ OBSERVED (DATE: 12/02/83) ☐ POTENTIAL ☐ ALLEGED  
04 NARRATIVE DESCRIPTION Population based on 3 mile radius site.  
Contamination of surface water has been observed in Silver Creek, (which runs south of site). In places the tailings go down to creek's edge. Samples were taken above and below Prospector Square. Comparison of samples show higher concentrations of arsenic, cadmium, chromium, and lead below Prospector's Square.

01 ☒ C. CONTAMINATION OF AIR  
03 POPULATION POTENTIALLY AFFECTED: 7 to 10,000\*\* 02 ☒ OBSERVED (DATE: \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED  
04 NARRATIVE DESCRIPTION Population based on 3 mile radius of site.  
High potential for contamination of air. Samples were put through sieves and, sample #HW83-094 had approx. 61% smaller than 75 micrometers. This size particle can be air-borne and could cause problems if ingested.

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS  
03 POPULATION POTENTIALLY AFFECTED: \_\_\_\_\_ 02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED  
04 NARRATIVE DESCRIPTION  
Not applicable

01 ☒ E. DIRECT CONTACT  
03 POPULATION POTENTIALLY AFFECTED: Approx 1,200 02 ☒ OBSERVED (DATE: \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED  
04 NARRATIVE DESCRIPTION Population based on 1 mile radius site.  
Business and homes are located on site. Residents and their children (approx. 100) are in contact with the tailings, which could be dangerous if ingested.

01 ☒ F. CONTAMINATION OF SOIL  
03 AREA POTENTIALLY AFFECTED: 40 02 ☒ OBSERVED (DATE: 12/02/83) ☐ POTENTIAL ☐ ALLEGED  
04 NARRATIVE DESCRIPTION  
Contamination of soil has been observed at Prospector Square. Some of the tailings on site have been mixed with fill and are now contaminated. Samples of tailings show high concentrations of lead, arsenic and cadmium. (see analysis #HW 83089)

01 ☒ G. DRINKING WATER CONTAMINATION  
03 POPULATION POTENTIALLY AFFECTED: 7 to 10,000 02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☒ POTENTIAL ☐ ALLEGED  
04 NARRATIVE DESCRIPTION Population based on 3 mile radius site.  
Potential exists for the contamination of drinking water by migration of leachate. There is 1 well on site and approximately 12 wells within 1 mile of site.

01 ☐ H. WORKER EXPOSURE/INJURY  
03 WORKERS POTENTIALLY AFFECTED: \_\_\_\_\_ 02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED  
04 NARRATIVE DESCRIPTION  
Not applicable

01 ☒ I. POPULATION EXPOSURE/INJURY  
03 POPULATION POTENTIALLY AFFECTED: Approx 1,200 02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☒ POTENTIAL ☐ ALLEGED  
04 NARRATIVE DESCRIPTION  
High potential for population injury. State Epidemiologist plans to take initial blood tests of residents by March 31, 1984. Approx. 100 residents and their children live on site and the small children might ingest the tailings.

\* When samples were taken Silver Creek had a frozen ice layer separating runoff from creek water, samples were taken of the runoff.

\*\* Population is \_\_\_\_\_ of the Park City area during the winter, in the summer it's between 2,500 to 3,000. (Information gathered from phone interview Park City municipal)



POTENTIAL HAZARDOUS WASTE SITE  
PRELIMINARY ASSESSMENT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I IDENTIFICATION

01 STATE 02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☒ J. DAMAGE TO FLORA  
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED

Residents couldn't grow grass, and also, trees wouldn't grow on mill tailings. Fill had to be brought in to get grass to grow.

01 ☒ K. DAMAGE TO FAUNA

04 NARRATIVE DESCRIPTION (include names of species)

02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☒ POTENTIAL ☐ ALLEGED

The potential exists for damage to fauna. At least 6 beaver and some muskrats live near the site on Silver Creek. Silver Creek is a 3A (waterquality) stream, it is a tributary of the Weber River which is a trout stream. Trout could be damaged if leachate were to migrate into Silver Creek.

01 ☒ L. CONTAMINATION OF FOOD CHAIN

04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☒ POTENTIAL ☐ ALLEGED

Potential exists for contamination of food chain (grass and roots) of beaver and muskrats that live and eat on Silver Creek. Crops that are irrigated by Silver Creek could also be contaminated, also metals could accumulate in game fish.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES

(Include name(s) of waste(s) and/or source(s))

03 POPULATION POTENTIALLY AFFECTED: Approx. 1,200

02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION Population within 1 mile.

There is no containment of the waste. It is now a development area with houses on tailings and tailings are also used as fill for buried pipelines. (See EP TOX analysis)

01 ☒ N. DAMAGE TO OFFSITE PROPERTY

04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☐ POTENTIAL ☒ ALLEGED

Alleged contamination of off-site property, there is no containment of waste, and it is easily moved by the waters of Silver Creek. Underground pipes used in construction on Prospector Square have been known to corrode more rapidly than in other areas.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTFs

04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED

Unknown

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING

04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED

Unknown. The tailings were disposed on-site by a number of different mines and we do not know if Prospector Square was a legal site for disposal.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: \_\_\_\_\_

IV. COMMENTS

State files, Interview with Frank Singleton Summit County Health  
Interview with Jim Salmon Utah State Health Dept.  
Interview with Mr. Quigley, Compliance Engineering

V. SOURCES OF INFORMATION (See specific references, e. g., State files, sample analysis, reports)

# PROSPECTOR SQUARE TAILINGS DATA

SAMPLE	TOTAL METALS IN PPM (EP TOXICITY IN PPM)							
	As	Cd(1)	Cr	Pb	(5)	<del>Hg</del> Hg	Ag	ZnH <sub>2</sub> O
TAILINGS*								
2 A	400	89( 1.7)	17	4000	(68)	3.9	55	7.6
2 B	350	85( 1.8)	16	2500	(67)	3.0	70	8.8
4 A	300	43( 1.1)	20	1350	(44)	7.4	26	11.7
4 B	270	48	15	1170	(28)	1.6	28	8.3
5 A	250	54	69	1340	(34)	4.8	41	12.0
5 B	360	46(1.05)	14	1420	(47)	13.3	34	16.3
Silver Creek**								
Above (ppb)	2	5	10	5		0.1	4	-
Below*** (ppb)	6	8	20	112		0.2	5	-

\*Number indicates location of UGMS borehole  
 Letter indicates: A = upper 2 inches  
 B = 12-18 inch depth

**Additional Metals	Cu	Fe	Mn	Zn
Above (ppb)	15	30	15	750
Below (ppb)	35	600	250	1090

\*\*\*Sample collected 10-28-83 by Park City indicated Cd (0.005 ppm) above 3 A W.Q. Std. (0.0004 ppm) in Silver Creek below Prospector Square

RECORD OF COMMUNICATION		<input checked="" type="checkbox"/> PHONE CALL <input type="checkbox"/> DISCUSSION <input type="checkbox"/> FIELD TRIP <input type="checkbox"/> CONFERENCE <input type="checkbox"/> OTHER (SPECIFY)	
		(Record of item checked above)	
TO: Fred Duberow J.J. Johnson & Assoc.		FROM: Marc L. Gosink E+E	DATE 4/23/84 TIME
SUBJECT Computation of land irrigated by intakes			
SUMMARY OF COMMUNICATION  Duberow believed about 500 acres were irrigated by diverted surface water.			
CONCLUSIONS, ACTION TAKEN OR REQUIRED  Used info. on HRS			
INFORMATION COPIES TO:			

REFERENCE 12

R. Channing Johnson  
The MITRE Corp.  
7 February 1985  
1:15 p.m.

Phone Call

To: Watt Holmes, USGS  
Salt Lake City, UT  
(801) 524-5654

I told him I heard that he had worked on the USGS ground water study for the Park City and (he agreed) asked him if there were more than one aquifer in the vicinity of Prospector Square and if they were interconnected.

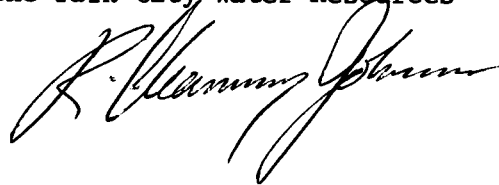
He said that there are more than one aquifer and that they are "clearly interconnected".

He cited the Park Meadow Well pump test (location: NE-NE-NE of section 8). 72 hours of pumping. Within 12 hours had dried up Dority Spring which is about a mile ENE of the well.

Likewise, the water level in the Cartier Well (20' deep in unconsolidated valley fill) was also dropped slightly.

The deeper aquifer pacific bridge well right at the northern side of the tailings area was also affected.

He said that details on these wells could be gotten from J.J. Johnson and Associates who did the Park City Water Resources study.



REFERENCE 14

R. Channing Johnson  
The MITRE Corp.  
6 February 1985  
1:35 p.m.

Phone Call

To: Marv Maxell  
Utah Dept. of Health  
Salt Lake City, UT  
(801) 533-6121

I asked him about private water supplies in the vicinity of the site.

He said that he believes the nearest are two trailer houses about 3/4 of a mile east of the tailings on route 40. Samples taken there showed nothing above water standards. The well on the north side of the road serves a dwelling and one trailer. The well on the south side of the road serves 3 trailers. He also mentioned the Raggedy Andy school with a 110' well across the street from Park West.

With respect to surface water, he noted that the downstream sample he took was actually in a thin stream of water (1/2 to 1" deep) flowing above the ice on the creek. The source of this water was the snow melt coming from the tailing pile.

A handwritten signature in cursive script, appearing to read "R. Channing Johnson".

REFERENCE 15

R. Channing Johnson  
The MITRE Corp.  
5 February 1985  
3:10 p.m.

Phone Call

To: Gerry Gibbs, Director  
Dept. of Public Works  
Park City, UT  
(801) 649-5912

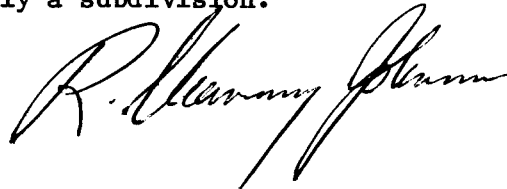
Regarding

- 1) Use of Pacific Bridge
- 2) Does service area include "Snyderville Basin Area"?
- 3) Number of persons served in winter

He has been at Park City 1 and 1/2 years and well has not been used in that time. He doesn't know when it was last used. The sulfur content is high, approximately 130 mg/l in 4/18/83 sample by the Utah State Dept. of Health. He said that the sample was stamped that no contaminants exceed drinking water standards. Reason for disuse is sulfur, not contamination. He said he does not foresee well being used for drinking and mentioned that city is hoping to be able to transfer the water rights.

The system serves only the city proper plus the district school. It has about 2400 metered connections. He said the permanent population is about 3000 and that the Chamber of Commerce says the area can handle about 10,000 tourists. Service does not cover Snyderville basin.

Service to people north of the city is provided by 5...maybe 11...private systems that are supplied as wells, he thinks. He said he wondered why these supplies have not been consolidated into a water district. At present, they each supply a subdivision.



#16

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: February 7, 1985

SUBJECT: Irrigated Acreage Near Silver Creek Tailings

FROM: Eric W. Johnson  
RSPO

*E. Johnson*

TO: File

I spoke with Mr. Mark Oliver today, of J.J. Johnson and Associates (801-649-9811), concerning the amount of irrigated acreage within three miles of the Silver Creek Tailings site. He indicated that there were at least 500 acres, and perhaps as many as 700 acres irrigated from Silver Creek within three miles of the site.

QA Review  
R. Channing Johnson  
30 January 1985

Silver Creek Tailings, UT

Page 2 - Depth

Work into the writeup on the aquifer the information in ref. 2 page 44 that the bedrock aquifer may be recharged from the alluvial in the nothern end of the valley. This makes the argument of hydrological connection stronger.

Ref. 2, page 1 supports "less than 10 feet."

Borehole 5, ref. 4 supports "11 feet" to lowest point of waste disposed

Page 3 - Physical State

Ref. 7 cover letter states that it "believes that some" of the material was water slurried. Either find another reference or qualify the documentation.

Page 4 - Containment

"Tailings deposited without containment on top of natural soil: ref. 4, boreholes" is an acceptable entry.

Page 4 - Toxicity/Persistence

Refer to the specific samples in ref. 7 or 11.

Page 4 - Quantity

Ref. 7, cover letter, after average depth put "(1 to 10 ft range)".

Page 5 - Use

Page 334 of ref. 9 was not included.

Page 5 - Distance

What is depth?

Fig. 13 not included for review.

Page 35 does not include info on "completed in the fractured woodside formation". Document.

Page 5 - Population

Page 2 of ref. 3 not included for review.

Page 6 - Observed Release

Base it on Pb (5 vs 112 ppb) and mention that the levels of As, Cd, Cr, Cu, Zn are also a bit elevated downstream vs upstream.

Note that cover letter in ref. 7 says that Pb, Cd, As and Ag (not Cr) were found in the tailings. Correct HRS documentation to square with reference

Page 8 - Toxicity/Persistence

Replace Cr with Ag or use another reference.

Page 8-10 - Targets

Is the irrigated acreage within 3 stream miles of the site? If the intakes at 2 and 1/4 and 2 and 1/2 miles are open ditches, then the length of the ditch counts as part of the distance.

Page 9 - Critical Habitat

Get reference stating that there are none.

Page 11 - Air Route

Insofar as air route is not evaluated, remove the air data from the documentation and the reference list.

You may want to put a statement at the top of this route to the effect that "although dust samples have been taken, the procedures used do not establish for HRS purposes that the dust migrated specifically by the air route."

Remove all remaining documentation from the record (pages 11-13).

Page 17 - Direct Contact

This section should be evaluated. I estimated a minimum score of 25.00.

References:

I need to scan the full copy of references 2, 3 and 9 before sign off. The material provided was too little to provide me a picture of the site and its hydrogeology.

Rev. 3/82  
Field No. **HW83095**

☒ TC ☒ TM ☐ Nut  
☒ PC ☐ PM ☐ BOD

Pest.  
Rad.  
Bact.  
Spec.

Date Recd.:  
Received By:

UTAH STATE DEPARTMENT OF HEALTH  
ENVIRONMENTAL HEALTH  
WATER ANALYSES

Dec 883834885

Storet No. [ ] [ ] [ ] [ ] [ ] [ ]  
Water Syst. No. Source No. [ ] [ ] [ ] [ ] [ ] [ ]  
Date Collected **703** Time Collected **703**  
**631202** **71300**  
Water Rights No. [ ] [ ] [ ] [ ] [ ] [ ]  
Vt. No. [ ] [ ] [ ] [ ] [ ] [ ]  
24-hour clock  
Exact Description of sampling Point  
**SILVER CREEK BELOW P**  
**ROSA PACTOR SQUARE TAIL**  
**LINGS HL LAST HOUSE**  
Supply Owned by [ ] [ ] [ ] [ ] [ ] [ ]  
Sample Type **713** **08** **710**  
Sample Collected by **M MAX ALL HALL GILL** **713**  
SEND REPORT TO: **JIM SALMON** **716**  
Phone [ ] [ ] [ ] [ ] [ ] [ ]  
zip [ ] [ ] [ ] [ ] [ ] [ ]

Sample Source **913** **719**  
County **212** **611**  
Current use **708**  
Proposed use **709**  
1. Culinary  
2. Agriculture  
3. Industrial  
4. Other  
Cost **362** **770**  
FIELD TESTS  
RECEIVED  
DEC 27 1983  
Temperature (°C) [ ] [ ] [ ] [ ] [ ] [ ]  
D.O., mg/l [ ] [ ] [ ] [ ] [ ] [ ]  
Sp. Cond.  $\mu$ mhos [ ] [ ] [ ] [ ] [ ] [ ]  
pH [ ] [ ] [ ] [ ] [ ] [ ]  
Flow, gpd [ ] [ ] [ ] [ ] [ ] [ ]  
Flow, cfs [ ] [ ] [ ] [ ] [ ] [ ]

2 Temperature (°C) [ ] [ ] [ ] [ ] [ ] [ ] **660** pH [ ] [ ] [ ] [ ] [ ] [ ] **782**  
mg/l  
B.O.D.<sub>5</sub> [ ] [ ] [ ] [ ] [ ] [ ] **784** T.O.C. [ ] [ ] [ ] [ ] [ ] [ ]  
Tot. Sus. Solids [ ] [ ] [ ] [ ] [ ] [ ] **787** C.O.D. [ ] [ ] [ ] [ ] [ ] [ ]  
NO<sub>2</sub>+NO<sub>3</sub>-N [ ] [ ] [ ] [ ] [ ] [ ] **602** Cyanide [ ] [ ] [ ] [ ] [ ] [ ]  
T.K.N. [ ] [ ] [ ] [ ] [ ] [ ] **778** Phenolics [ ] [ ] [ ] [ ] [ ] [ ]  
Oil & Grease [ ] [ ] [ ] [ ] [ ] [ ] **780** Sulfide [ ] [ ] [ ] [ ] [ ] [ ]

*are*  
These two documents  
should be included  
in HRS documentation.  
*Arb*

3 Filtered [ ] Unfiltered [ ]  
mg/l CATIONS mg/l ug/l (ppb)  
Ammonia as N [ ] [ ] [ ] [ ] [ ] [ ]  
Arsenic [ ] [ ] [ ] [ ] [ ] [ ]  
Barium [ ] [ ] [ ] [ ] [ ] [ ]  
Boron [ ] [ ] [ ] [ ] [ ] [ ]  
Cadmium [ ] [ ] [ ] [ ] [ ] [ ]  
Calcium [ ] [ ] [ ] [ ] [ ] [ ]  
Chromium [ ] [ ] [ ] [ ] [ ] [ ]  
Chromium, Hex. as Cr [ ] [ ] [ ] [ ] [ ] [ ]  
Copper [ ] [ ] [ ] [ ] [ ] [ ]  
Iron, dissolved [ ] [ ] [ ] [ ] [ ] [ ]  
Lead [ ] [ ] [ ] [ ] [ ] [ ]  
Magnesium [ ] [ ] [ ] [ ] [ ] [ ]  
Manganese [ ] [ ] [ ] [ ] [ ] [ ]  
Nickel [ ] [ ] [ ] [ ] [ ] [ ]  
Potassium [ ] [ ] [ ] [ ] [ ] [ ]  
Selenium [ ] [ ] [ ] [ ] [ ] [ ]  
Silver [ ] [ ] [ ] [ ] [ ] [ ]  
Sodium [ ] [ ] [ ] [ ] [ ] [ ]  
Zinc [ ] [ ] [ ] [ ] [ ] [ ]

TOTAL CATIONS [ ] [ ] [ ] [ ] [ ] [ ]  
☒ Sp. Cond.  $\mu$ mhos/cm. [ ] [ ] [ ] [ ] [ ] [ ] **762**  
☒ TDS @ 180°C [ ] [ ] [ ] [ ] [ ] [ ] **786**

Total Alk. as CaCO<sub>3</sub> [ ] [ ] [ ] [ ] [ ] [ ]  
T. Hdns. as CaCO<sub>3</sub> [ ] [ ] [ ] [ ] [ ] [ ] **764**  
Surfactant as MBAS [ ] [ ] [ ] [ ] [ ] [ ] **773**  
Turbidity, as NTU [ ] [ ] [ ] [ ] [ ] [ ] **757**  
Sp. Gravity [ ] [ ] [ ] [ ] [ ] [ ] **608**

ICT. LAB. No. [ ] [ ] [ ] [ ] [ ] [ ]  
[ ] [ ] [ ] [ ] [ ] [ ] **658**  
[ ] [ ] [ ] [ ] [ ] [ ] **657**  
[ ] [ ] [ ] [ ] [ ] [ ] **656**  
[ ] [ ] [ ] [ ] [ ] [ ] **654**  
[ ] [ ] [ ] [ ] [ ] [ ] **655**  
[ ] [ ] [ ] [ ] [ ] [ ] **659**

pH, units **7.7**  
TOTAL METALS ANALYSIS  
CATIONS mg/l ug/l (ppb)  
Aluminum [ ] [ ] [ ] [ ] [ ] [ ] **800**  
Arsenic [ ] [ ] [ ] [ ] [ ] [ ] **660**  
Barium [ ] [ ] [ ] [ ] [ ] [ ] **661**  
Beryllium [ ] [ ] [ ] [ ] [ ] [ ] **801**  
Cadmium [ ] [ ] [ ] [ ] [ ] [ ] **662**  
Chromium [ ] [ ] [ ] [ ] [ ] [ ] **663**  
Cobalt [ ] [ ] [ ] [ ] [ ] [ ] **804**  
Copper [ ] [ ] [ ] [ ] [ ] [ ] **664**  
Gold [ ] [ ] [ ] [ ] [ ] [ ] **700**  
Iron [ ] [ ] [ ] [ ] [ ] [ ] **755**  
Lead [ ] [ ] [ ] [ ] [ ] [ ] **665**  
Manganese [ ] [ ] [ ] [ ] [ ] [ ] **666**  
Mercury [ ] [ ] [ ] [ ] [ ] [ ] **739**  
Molybdenum [ ] [ ] [ ] [ ] [ ] [ ] **802**  
Nickel [ ] [ ] [ ] [ ] [ ] [ ] **667**  
Selenium [ ] [ ] [ ] [ ] [ ] [ ] **668**  
Silver [ ] [ ] [ ] [ ] [ ] [ ] **669**  
Uranium [ ] [ ] [ ] [ ] [ ] [ ] **601**  
Vanadium [ ] [ ] [ ] [ ] [ ] [ ] **803**  
Zinc [ ] [ ] [ ] [ ] [ ] [ ] **670**

6 RADIOLOGICS  
Alpha, gross [ ] [ ] [ ] [ ] [ ] [ ] **621** **89Sr** [ ] [ ] [ ] [ ] [ ] [ ] **633**  
Beta, gross [ ] [ ] [ ] [ ] [ ] [ ] **623** **131I** [ ] [ ] [ ] [ ] [ ] [ ] **635**  
Tritium, <sup>3</sup>H [ ] [ ] [ ] [ ] [ ] [ ] **625** **134Cs** [ ] [ ] [ ] [ ] [ ] [ ] **637**  
226 Radium [ ] [ ] [ ] [ ] [ ] [ ] **627** **137Cs** [ ] [ ] [ ] [ ] [ ] [ ] **639**  
228 Radium [ ] [ ] [ ] [ ] [ ] [ ] **629**  
90Sr [ ] [ ] [ ] [ ] [ ] [ ] **631**

INTERPRETATION OF ANALYSES:  
Remarks:  
Based on State Standards, this sample was:  
B.O.D.<sub>5</sub>  
Tot. Sus. Solids  
M.P.N. Total Coliform.  
M.P.N. Fecal Coliform.  
Satisfactory  
Conditional  
Unsatisfactory

Analyses Approved By: **RE2** Date: **83/22/1**

By: ENVIRONMENTAL HEALTH

Rev. 3/82  
Field No. **HW83025**

TC ☒ TM ☐ Nut ☐  
PC ☐ PM ☐ BOD ☐

Pest. ☐  
Rad. ☐  
Bact. ☐  
Spec. ☐

Date Recd. \_\_\_\_\_  
Received By: \_\_\_\_\_

UTAH STATE DEPARTMENT OF HEALTH  
ENVIRONMENTAL HEALTH  
WATER ANALYSES

Dec **883834685**

Sample No. **707**

Store No. \_\_\_\_\_  
Water Syst. No. Source No. \_\_\_\_\_  
Date Collected **703** Time Collected **1300**  
Water Rights No. \_\_\_\_\_  
Yr. Mo. dy. 24-hour clock

Exact Description of Sampling Point  
**SILVER CREEK BELOW P 648**  
**ROSALECTOR SQUARE TAIL**  
**LINGS BL LAST HOUSE**

Supply Owned by \_\_\_\_\_ Sample Type **08**

Sample Collected by **M MAX ALL HALL GILL**

SEND REPORT TO: Phone \_\_\_\_\_  
**JIM SALMON**  
zip code \_\_\_\_\_

Sample Source **013** County **22**  
01 Spring 14 Other  
02 Well 15 Tunnel  
03 Stream 16 Artesian  
04 Lake well  
05 Dist. syst. 19 Swimming  
07 Effluent pool  
08 Storm sewer  
01 Beaver 14 Plute  
02 Box Elder 17 Rich  
03 Cache 18 Salt Lake  
04 Carbon 19 San Juan  
05 Coconino 20 Sanpete  
06 Davis 21 Sevier  
07 Duchesne 22 Summit  
08 Emery 23 Tooele  
09 Garfield 24 Uintah  
10 Grand 25 Utah  
11 Iron 26 Wasatch  
12 Juab 27 Washington  
13 Kane 28 Wayne  
14 Millard 29 Weber  
15 Morgan

- Current use **2** 708  
Proposed use **2** 709  
1. Cullinary  
2. Agriculture  
3. Industrial  
4. Other

Cost **362** 770

FIELD TESTS  
**RECEIVED**  
Temperature (°C) \_\_\_\_\_  
D.O., mg/l \_\_\_\_\_  
Sp. Cond.  $\mu$ mhos \_\_\_\_\_  
pH \_\_\_\_\_  
Sp. Gravity \_\_\_\_\_  
Transparency, m \_\_\_\_\_  
Flow, mgd \_\_\_\_\_  
Flow, cfs \_\_\_\_\_

2 Temperature (°C) **650** pH **782** WASTEWATER ANALYSIS BACT. LAB. No. \_\_\_\_\_

B.O.D.<sub>5</sub> **794** T.O.C. **671** M.P.N. Total Coliforms/100ml **658**  
Tot. Sus. Solids **787** C.O.D. **777** M.P.N. Fecal Coliforms/100ml **657**  
NO<sub>2</sub>+NO<sub>3</sub>-N **602** Cyanide **775** Fecal Strep C/100ml. **656**  
T.K.N. **778** Phenolics **783** M.F. Total Coliforms/100ml. **654**  
Oil & Grease **780** Sulfide **672** M.F. Fecal Coliforms/100ml. **655**  
Plate Count-Org./ml. **599**

3 Filtered Unfiltered 4 CHEMICAL ANALYSIS pH, units **7.7**

mg/l ug/l (ppb)  
Ammonia as N **722**  
Arsenic **723**  
Barium **724**  
Boron **725**  
Cadmium **727**  
Calcium **728**  
Chromium **729**  
Chromium, Hex. as Cr **730**  
Copper **732**  
Iron, dissolved **733**  
Lead **734**  
Magnesium **737**  
Manganese **738**  
Nickel **740**  
Potassium **742**  
Selenium **743**  
Silver **744**  
Sodium **745**  
Zinc **749**  
TOTAL CATIONS \_\_\_\_\_

mg/l  
Bicarbonate **130** 758  
Carbon Dioxide **4** 759  
Carbonate **0** 760  
Chloride **540** 763  
CO<sub>2</sub> Solids **64** 765  
Fluoride **0.000** 767  
Hydrosulfide **0.000** 767  
Nitrate as N **605** 767  
Nitrite as N **606** 767  
Phosphorus, Ortho as P **607** 767  
Silica, dissolved as SiO<sub>2</sub> **750** 767  
Sulfate **110** 772  
TOTAL ANIONS  
GRAND TOTAL  
Tot. Phosphorus **785**  
Total Alk. as CaCO<sub>3</sub> **107** 752  
T. Hdns. as CaCO<sub>3</sub> **754**  
Surfactant as MBAS **773**  
Turbidity, as NTU **757**  
Sp. Gravity **608**

mg/l ug/l (ppb)  
Aluminum **800**  
Arsenic **660**  
Barium **661**  
Beryllium **801**  
Cadmium **662**  
Chromium **663**  
Cobalt **804**  
Copper **664**  
Gold **700**  
Iron **755**  
Lead **665**  
Manganese **666**  
Mercury **739**  
Molybdenum **802**  
Nickel **667**  
Selenium **668**  
Silver **669**  
Uranium **601**  
Vanadium **803**  
Zinc **670**

6 RADIOLOGICS  
Alpha, gross **621** <sup>89</sup>Sr **633**  
Beta, gross **623** <sup>131</sup>I **635**  
Tritium, <sup>3</sup>H **625** <sup>134</sup>Cs **637**  
226 Radium **627** <sup>137</sup>Cs **639**  
228 Radium **629**  
90Sr **631**

INTERPRETATION OF ANALYSES:  
Remarks: \_\_\_\_\_  
Based on State Standards, this sample was: \_\_\_\_\_  
B.O.D.<sub>5</sub> \_\_\_\_\_  
Tot. Sus. Solids \_\_\_\_\_  
M.P.N. Total Coliform. \_\_\_\_\_  
M.P.N. Fecal Coliform. \_\_\_\_\_  
Satisfactory \_\_\_\_\_  
Conditional \_\_\_\_\_  
Unsatisfactory \_\_\_\_\_

Analyses Approved By: **REK** Date: **83/22/1**

By: \_\_\_\_\_ ENVIRONMENTAL HEALTH

Rev. 3/82

Field No.

HW83096

TC

PC

TM

PM

Nut

BOD

Pest.

Rad.

Bact.

Spec.

Date Recd.

Received By:

UTAH STATE DEPARTMENT OF HEALTH

ENVIRONMENTAL HEALTH

WATER ANALYSES

DEC 883834886

Sample No.

707

Storet No.

Water Syst. No. Source No.

Date Collected

Time Collected

Water Rights No.

yr. mo. day

24-hour clock

Exact Description of sampling Point

SALLER CREEK ABOVE A 646  
LOSPECTOR SQUARE AT  
LROU HERSE-BOWANZA

Supply Owned by

Sample Type

Sample Collected by

M. MAXELL HALL 646

SEND REPORT TO:

Phone

JRM SALMON 716  
648  
717

zip code

Sample Source

01 Spring 14 Other  
02 Well 15 Tunnel  
03 Stream 16 Artesian  
04 Lake well  
06 Dist. syst. 19 Swimming  
07 Effluent pool  
08 Storm sewer

County

01 Beaver 16 Plute  
02 Box Elder 17 Rich  
03 Cache 18 Salt Lake  
04 Carbon 19 San Juan  
05 Daguerre 20 Sevier  
06 Davis 21 Summit  
07 Duchesne 22 Tipton  
08 Emery 23 Uintah  
09 Garfield 24 Utah  
10 Grand 25 Wasatch  
11 Iron 26 Washington  
12 Juab 27 Wayne  
13 Kane 28 Weber  
14 Kintore 29 Wood

Current use

Proposed use

1. Culinary  
2. Agriculture  
3. Industrial  
4. Other

Cost Code 362 770

1 FIELD TESTS

Temperature (°C)

D.O., mg/l

Sp. Cond.  $\mu$ mhos/cm

pH

Sp. Gravity

Transparency, m

CO<sub>2</sub>, mg/l

Depth, m

Cl Resid., mg/l

Flow, MGD

Flow, GPM

Flow, cfs

2 Temperature (°C)

pH

WASTEWATER ANALYSIS

BACT. LAB. No.

B.O.D.<sub>5</sub>  
Tot. Sus. Solids  
NO<sub>2</sub>-NO<sub>3</sub>-N  
T.K.N.  
Oil & Grease

mg/l

T.O.C.

C.O.D.

Cyanide

Phenolics

Sulfide

mg/l

M.P.N. Total Coliforms/100ml  
M.P.N. Fecal Coliforms/100ml  
Fecal Strep C/100ml  
M.F. Total Coliforms/100ml  
M.F. Fecal Coliforms/100ml  
Plate Count-Org./ml.

3 Filtered Unfiltered

mg/l

CATIONS mg/l ug/l (ppb)

Arsenic as N 722  
Arsenic 723  
Barium 724  
Boron 725  
Cadmium 727  
Calcium 728  
Chromium 729  
Chromium, Hex. as Cr 730  
Copper 732  
Iron, dissolved 733  
Lead 734  
Magnesium 737  
Manganese 738  
Nickel 740  
Potassium 742  
Selenium 743  
Silver 744  
Sodium 745  
Zinc 749

TOTAL CATIONS

Sp. Cond.  $\mu$ mhos/cm.

TDS @ 180°C

6 RADIOLOGICS

Alpha, gross 621 89Sr 633  
Beta, gross 623 131I 636  
Tritium, <sup>3</sup>H 625 134Cs 637  
226 Radium 627 137Cs 639  
228 Radium 629  
90Sr 631

Analyses Approved By:

Date: 831221

By: ENVIRONMENTAL HEALTH

INTERPRETATION OF ANALYSES:

Remarks:

Based on State Standards,  
this sample was:B.O.D.<sub>5</sub>

Tot. Sus. Solids

M.P.N. Total Coliform.

M.P.N. Fecal Coliform.

Reliability  
Completeness  
Unsaturation



CHEMICAL & MINERALOGICAL SERVICES • 445 WEST 2700 SOUTH • SALT LAKE CITY, UTAH 84115 • (801) 485-0711

ANALYTICAL REPORT FOR:

UTAH GEOLOGICAL & MINERAL SURVEY

HAROLD E. GILL

606 BLACK HAWK WAY

SALT LAKE CITY, UTAH 84108

!Invoice # 16120

!Date 9/30/83

!Customer # 614269

Sample #	Pb %	Cd ppm	As ppm	Hg ppb
YORKTOWN EXC.	.485	180	275	470
BORING #2	.975	185	550	1080
BORING #4	.225	100	160	1780
BORING #5	.580	170	400	1370
BORING #6	.405	125	190	1290

- possibly somewhat  
leached, hard core  
due to old excavation  
- no calcium found

Composite sample of bulk sample taken at one foot intervals

Lab is not certified.

*J. Broedelhof*  
.....  
Your Consulting Chemist



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ANALYTICAL REPORT FOR:

UTAH GEOLOGICAL & MINERAL SURVEY

!Invoice # 16120

606 BLACK HAWK WAY

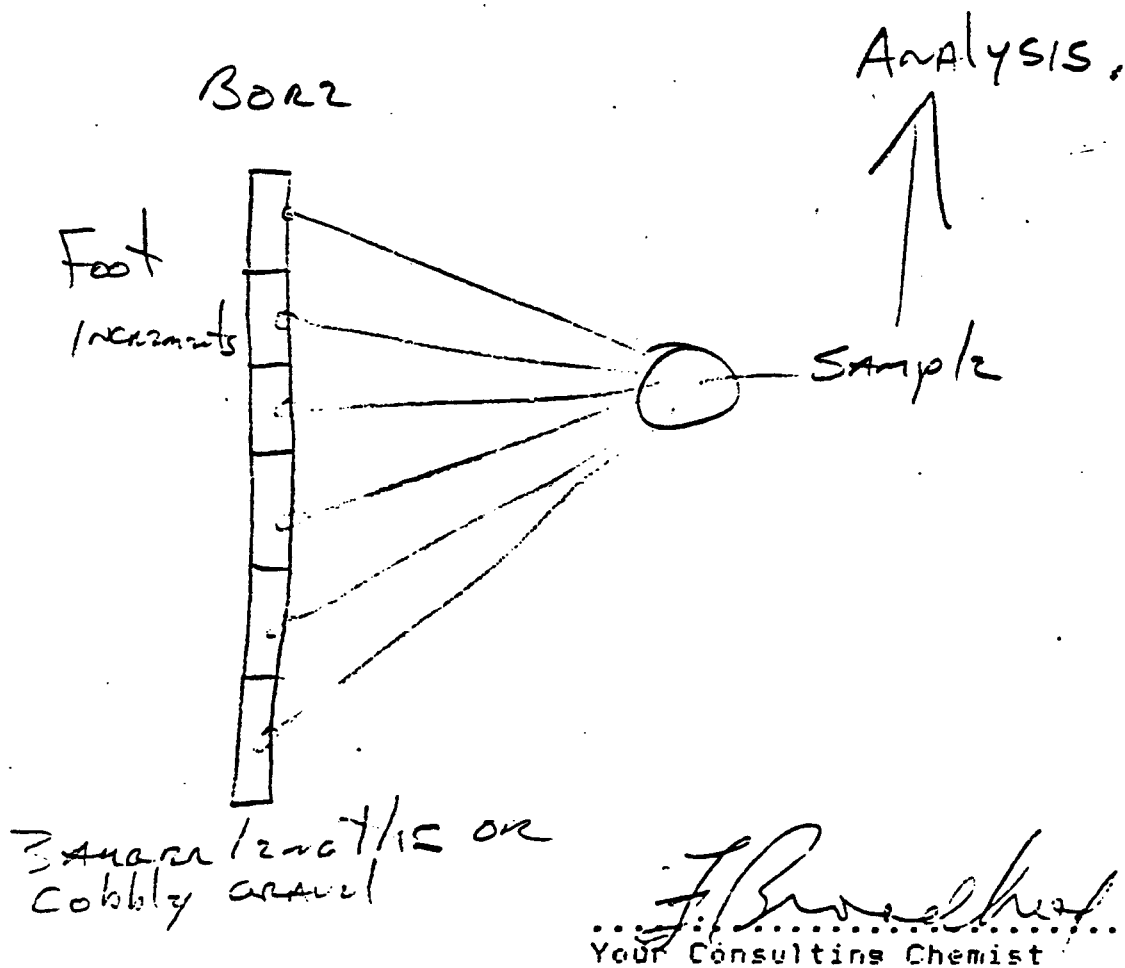
HAROLD E. GILL

!Date 9/30/83

SALT LAKE CITY, UTAH 84108

!Customer # 614269

Sample #	Pb %	Cd ppm	As ppm	Hg ppb
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BORING #4	.225	100	160	1780
BORING #5	.580	170	400	1370
BORING #6	.405	125	190	1290



BORING LOGS  
Prospector Square Area, Park City, Utah

Soil Description\*

Boring No. 1

- 0.0' - 2.0' Silty sand with clay (SM); possible tailings, dark brown, low density, nonplastic to low plasticity, nonindurated, moist.
- 2.0' - 4.0' Silty clay (CL); possible tailings, dark brown, soft, medium plastic, nonindurated, moist. *smelly, dark, possibly tailing*
- 4.0' - 5.0' Clayey sand (SC); possible tailings, dark brown, low density, low to medium plasticity, nonindurated, moist; tried four different locations and could not get below 5' due to a gravel-cobble horizon, which is natural material.

Note: Ground water not encountered.

Boring No. 2

- 0.0' - 4.0' Silty sand (SM); tailings, brown, loose, nonplastic, nonindurated, moist to dry; could not go below 4.0' due to gravel-cobble horizon (natural material). Sample taken and chemical analysis run.

Note: Ground water not encountered.

Boring No. 2a

- 0.0' - 1.0' Silty sand (SM); tailings, light brown, loose, nonplastic to low plasticity, nonindurated, moist to dry.
- 1.0' - 3.0' Silty sand - silty gravel (SM-GM); tailings, brown, loose, nonplastic, nonindurated, dry to moist.
- 3.0' - 5.0' Gravel (GP); possible natural soil, brown, loose, nonplastic, nonindurated, dry; could not go deeper than 5.0' due to cobble-gravel horizon (natural material). Sample taken at this location.

Note: Ground water not encountered.

\*Soil descriptions conform to ASTM Standard D 2488-69. All grain size percentages are field estimates.

Boring No. 3

- 0.0' - 1.5' Clayey sand - sandy clay (SC-CL); tailings, dark brown, loose, low plasticity, nonindurated, moist.
- 1.5' - 3.5' Silty clay (CL); tailings, yellow brown, firm, medium plasticity, nonindurated, moist.
- 3.5' - 6.0' Clayey gravel (GC); tailings, brown, loose, low to no plasticity, nonindurated, moist; could not go deeper than 6.0' due to gravel-cobble horizon (natural material). Sample taken.

Note: Ground water not encountered.

Boring No. 4

- 0.0' - 2.5' Sand (SP); tailings, brown, loose, nonplastic, nonindurated, moist.
- 2.5' - 4.5' Clay (CH); tailings, dark brown, stiff to very stiff, high plasticity, nonindurated, moist.
- 4.5' - 5.5' Silty clay (CL); tailings, brown, firm to stiff, medium to high plasticity, nonindurated, moist; could not go below 5.5' due to gravel-cobble horizon (natural material). Sample taken and chemical analysis run.

Note: Ground water not encountered.

Boring No. 5

- 0.0' - 2.0' Sand - Silty sand (SP-SM); tailings, light brown, loose, nonplastic, nonindurated, moist.
- 2.0' - 5.0' Sand (SP); tailings, light brown, loose, nonplastic, nonindurated, moist.
- 5.0' - 10.0' Sandy clay (CL); tailings, black, soft, medium plasticity, nonindurated, wet to saturated.
- 10.0' - 11.0' Silty clay (CL); tailings, dark brown, soft, low plasticity, nonindurated, wet to saturated; could not go below 11.0' due to gravel-cobble horizon (natural material). Sample taken and chemical analysis run.

Note: Standing ground water not encountered. however, soil moisture conditions suggest the ground-water level is probably between 11 and 13 feet.

Boring No. 6

- 0.0' - 1.0' Sand (SP); tailings, light brown, loose, nonplastic, nonindurated, moist.
- 1.0' - 9.0' Silty clay (CL); tailings, dark brown, soft to firm, medium plasticity, nonindurated, wet to saturated; could not go below 9.0' due to gravel-cobble horizon (natural material). Sample taken and chemical analysis run.

Note: Boring caved before water reading could be taken. Auger stem was wet at 7.5' which would place the water level at approximately 8 to 9 feet below the surface.

Boring No. 7

- 0.0' - 2.5' Silty sand (SM); fill material (wood chips); brown, loose, none to low plasticity, nonindurated, moist.
- 2.5' - 4.0' Silty sand - silty gravel (SM-GM); tailings, brown, loose, nonplastic, nonindurated, moist.
- 4.0' - 7.5' Silty clay (CL); tailings, black, soft, low to medium plasticity, nonindurated, moist.
- 7.5' - 9.0' Clayey gravel (GC); tailings, brown, low density, none to low plasticity, nonindurated, moist; could not go below 9.0' due to gravel-cobble horizon (natural material). Sample taken.

Note: Ground water not encountered.

Boring No. 8

- 0.0' - 2.5' Silty sand - silty gravel (SM-GM); natural material, brown, loose, nonplastic, nonindurated, moist; .

Note: Ground water not encountered.

Boring No. 9

- 0.0' - 7.0' Silty sand with gravel (SM); natural material, brown loose, nonplastic, nonindurated, moist; .

Note: Ground water not encountered.

### Yorktown Excavation

- 0.0' - 0.6' Sand (SP); tailings, light brown, medium dense, nonplastic, weakly to moderately indurated, dry.
- 0.6' - 2.0' Sand with gravel (SP); tailings, light brown, medium dense, nonplastic, weakly to moderately indurated, dry.
- 2.0' - 4.0' Silty clay (CL); tailings, brown, firm, medium plasticity, weakly to moderately indurated, dry.
- 4.0' - 10.0' Cobbly gravel (GP); natural soil, brown, medium dense, nonplastic, weakly to moderately indurated, dry; this is the natural material that stopped the drilling in all of the borings, approximately 20% cobbles and 40% gravel. Sample taken and chemical analysis run.

Note: Ground water not encountered.

COMPARISON OF PROSPECTOR SQUARE ANALYSIS  
WITH ESTABLISHED STANDARDS

ARSENIC

USGS Bull. 1466 (1979)  
normal soils: less than 1-40ppm.

Hawkes and Webb (1962)\*  
normal soils: average 5ppm  
range 1-50ppm

Prospector Square  
160-550ppm

Toxicity (Bowen, 1966)  
7-67ppm/day/750mg./day deit

CADMIUM

USGS Bull. 1466 (1979)  
earths crust: 0.15-0.2ppm

Hawkes and Webb (1962)  
normal soils: average 0.5ppm

Prospector Square  
100-185ppm

Toxicity (Fleischer, 1979)  
4ppm/day/750g/day deit

LEAD

USGS Bull. 1466 (1979)  
most soils: Brewer (1966b): less than  
1ppm

Hawkes and Webb (1962)  
normal soils: average 10ppm  
range 2-200ppm

Prospector Square  
.225%-.975%

Toxicity (Patterson, 1965)  
0.5-0.8ppm in blood is the  
threshold for acute lead  
poisoning

MERCURY

USGS Bull. 1466 (1979)  
normal soil: 71ppb

Hawkes and Webb (1962)  
normal soils: range 0.03-0.3ppm(1934)

Prospector Square  
470-1780ppb

Toxicity (Bowen, 1966)  
200-400ppm/day/750g deit

\* Geochemistry textbook

# Leachability

83-088  
 Cadmium 84 1.1  
 Lead 4000 68  
 $\frac{1360}{4000} = 34\%$

83-090

Cadmium 85 1.8  
 $\frac{36}{85} = 42\%$   
 Lead 2500 67  
 $\frac{1340}{2500} = 54\%$

83-091

Cadmium 88 1.4  
 $\frac{72}{88} = 51\%$   
 Lead 1350 44  
 $\frac{580}{1350} = 65\%$

83-092

Cadmium 48 .87  
 $\frac{15.4}{48} = 32\%$   
 Lead 1170 28  
 $\frac{560}{1170} = 48\%$

83-093

Cadmium 54 .79  
 $\frac{15.8}{54} = 33\%$   
 Lead 1340 34  
 $\frac{650}{1340} = 51\%$

83-094

Cadmium 46 1.05  
 $\frac{21}{46} = 46\%$   
 Lead 1420 47  
 $\frac{940}{1420} = 66\%$

PROSPECTOR SQUARE LEACHABILITY STUDIES

<u>SAMPLE NUMBER</u>		<u>1.</u> <u>TOTAL</u>	<u>1.</u> <u>EXTRACTED BY EP TOXICITY</u>	<u>PERCENT EXTRACT.</u>
83089	CADMIUM LEAD	89 4000	1.7 68	$34/89 = 38\%$ $1360/4000 = 34\%$
83090	CADMIUM LEAD	85 2500	1.8 67	$36/85 = 42\%$ $1340/2500 = 54\%$
83091	CADMIUM LEAD	43 1350	1.1 44	$22/43 = 51\%$ $880/1350 = 65\%$
83092	CADMIUM LEAD	48 1170	0.87 28	$15.4/48 = 32\%$ $560/1170 = 48\%$
83093	CADMIUM LEAD	54 1340	0.79 34	$15.8/48 = 33\%$ $680/1340 = 51\%$
83094	CADMIUM LEAD	46 1420	1.05 47	$21/46 = 46\%$ $940/1420 = 66\%$

1. Units = parts per million (ppm)

Source: Utah Health Department

Scott M. Matheson  
Governor



STATE OF UTAH  
DEPARTMENT OF HEALTH

150 West North Temple, P.O. Box 2500, Salt Lake City, Utah 84110-2500

January 31, 1984

James O. Mason, M.D., Dr.P.H.  
Executive Director  
801-533-6111

DIVISIONS

Community Health Services  
Environmental Health  
Family Health Services  
Health Care Financing

OFFICES

Administrative Services  
Community Health Nursing  
Management Planning  
Medical Examiner  
State Health Laboratory

Dear Parents and Other Park City Residents:

By now, you have probably heard of the presence of mine tailings that were deposited years ago in the Park City Area. The Utah Department of Health has confirmed elevated levels of lead in one such tailings area located at Prospector Square.

It is not currently possible to say with certainty whether there is, or is not, a potential health hazard associated with living and playing on the tailings. Children appear to be more sensitive to excessive lead exposure than adults. Therefore, to investigate these issues, the Rocky Mountain Center of Occupational and Environmental Health (RMCCEH) of the University of Utah School of Medicine, the Utah Department of Health and the Summit County Health Department are conducting a very important pilot study.

We respectfully request your participation in this investigation. We would like to administer a short questionnaire to you and your family (children ages 3-12 years), and to draw a small amount of blood (about 1 teaspoonful) from a vein in the arm of your children. The blood sample will be analyzed (at no cost to you) to determine evidence of excessive lead in the body. We would like to conduct this study in March 1984 and again in late summer, 1984.

Your participation is, of course, voluntary. It is extremely important for as many residents as possible to participate in this study to make it scientifically valid. Your involvement will be held in strictest confidence. We will inform you, by letter, of your results and what they mean. You may withdraw at any time from the study.

Even if you elect not to participate in this study, your answers to the attached questions are essential to the valid development of the study. Please take a moment to complete the questionnaire and then return it in the inclosed business reply envelope. If you do elect to participate, we will contact you again in March to schedule our visit with you.

Park City Health Study  
January 31, 1983  
Page 2

Thank you for your consideration of this request. If you have any questions or comments, please call the Summit County Health Department at 649-9072.

Sincerely,

---

Michael J Stapley, MPA  
Acting Executive Director  
Utah Department of Health

---

Frank Singleton, MPH  
Director  
Summit County Health Dept.

---

Ed Stafford, M.D.  
Rocky Mountain Center for Occupational  
and Environmental Health



James O. Mason, M.D., Dr.P.H.  
Executive Director  
801-533-6111

DIVISIONS

Community Health Services  
Environmental Health  
Family Health Services  
Health Care Financing

OFFICES

Administrative Services  
Community Health Nursing  
Management Planning  
Medical Examiner  
State Health Laboratory

STATE OF UTAH  
DEPARTMENT OF HEALTH

150 West North Temple, P.O. Box 2500, Salt Lake City, Utah 84110-2500

PARK CITY HEALTH STUDY

☐ Yes, we wish to participate  
in this investigation  
☐ No, we are not interested

Please complete the following questions, regardless of your answer above.

1. Your Address: (P.O. Box): \_\_\_\_\_

Street Address: \_\_\_\_\_

2. Your Phone # \_\_\_\_\_

3. How long (in months) have you lived at this address \_\_\_\_\_  
# Months

4. Please list the names and ages of all members of your household. Start with yourself.

Name

Age

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

5. Do you obtain drinking and cooking water from: (check one)

☐ Public Water Supply?

☐ Private Well?

☐ Some Other Source? Specify \_\_\_\_\_

☐ Don't Know

6. Based on the knowledge you now have, please list what you believe to be the major potential health problems that might result from excessive lead exposure.

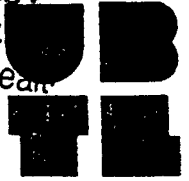
_____
_____
_____
_____

☐ I don't know of any

RECEIVED

JAN 27 1984

January 25, 1984 Utah State Div.  
Environmental Health



UBTL  
520 WAKARA WAY  
SALT LAKE CITY,  
UTAH 84108  
801 581-8267

ANALYTICAL REPORT

SUBMITTED TO: R.K. Kronstadt  
SUBMITTED BY: A. Brent Torgensen  
REFERENCE DATA:

Analysis of: Arsenic, Barium, Cadmium, Chromium, Lead,  
Mercury, Selenium, and Silver  
Identification No.: 84-498  
Sample(s): 1 Analyses: 8  
UBTL Laboratory No.: CE-3551

The above numbered soil sample was leached and analyzed according to the EPA Manual for "Test Methods for Evaluating Solid Waste, "EPA Publication No. SW-846, section 7, "EP" Toxicity Procedure and Section 8, Analytical Methods. The analyses were performed with an atomic absorption spectrophotometer.

The limit of detection and method numbers according to the above reference are as follows:

	<u>LOD</u>	<u>Method No.</u>
Arsenic	0.01 mg/L	206.2
Barium	0.1 mg/L	208.1
Cadmium	0.01 mg/L	213.1
Chromium	0.1 mg/L	218.1
Lead	0.01 mg/L	239.2
Mercury	0.0005 mg/L	245.1
Selenium	0.01 mg/L	270.2
Silver	0.01 mg/L	272.1

Leachability:  
Arsenic 89%  
Cadmium 46%  
Chromium 50%  
Lead 66%

Copy to:  
1. Jim Salmon  
2. Kent Gray  
3. Don Vrabica  
Joel Haddon  
1-30-84

MARY MAXELL  
DEC. KILN DUST  
SAMPLE.  
PORTLAND CEMENT.

RK

A DIVISION OF  
THE UNIVERSITY OF UTAH  
RESEARCH INSTITUTE  
MEDICINE  
BIOENGINEERING  
CHEMISTRY  
RESEARCH  
DEVELOPMENT  
ANALYSIS



UBTL Identification Number 84-498

S.L.C. UT 84110

Telephone 328-4891

Date Samples Received at UBTL January 3, 1984

1-24-84

### Comments

Laboratory Supervisor

RECEIVED

JAN 27 1984

Utah State Div. Of

January 25, 1984  
Environmental HealthANALYTICAL REPORT

SUBMITTED TO: R.K. Kronstadt  
SUBMITTED BY: A. Brent Torgensen  
REFERENCE DATA:

Analysis of: Arsenic, Barium, Cadmium, Chromium, Lead,  
Mercury, Selenium, and Silver

Identification No.: 84-489

Sample(s): 1 Analyses: 8

UBTL Laboratory No.: CE-3513

UBTL  
520 WAKARA WA  
SALT LAKE CITY  
UTAH 84108  
801 581-8267

The above numbered soil sample was made ready for analysis by weighing a portion, about one gram, and digesting for metals with nitric and perchloric acids. The digest was brought to a final volume of 100 mL with D.I. water.

The above numbered soil digest was analyzed according to "EPA-600/4-79-020 Methods for Chemical Analysis of Water and Wastes."

The limits of detection and method numbers according to the above reference are as follows:

	<u>LOD</u>	<u>Method No.</u>
Arsenic	1. $\mu\text{g/g}$	206.2
Barium	10. $\mu\text{g/g}$	208.1
Cadmium	1. $\mu\text{g/g}$	213.1
Chromium	10. $\mu\text{g/g}$	218.2
Lead	1. $\mu\text{g/g}$	239.2
Mercury	0.05 $\mu\text{g/g}$	245.1
Selenium	1. $\mu\text{g/g}$	270.2
Silver	1. $\mu\text{g/L}$	272.1

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MEDICINE  
BIOENGINEERING  
CHEMISTRY

RESEARCH  
DEVELOPMENT  
ANALYSIS



UBTL Identification Number 84-489

S.L.C. UT 84110

Telephone 328-4891

Date Samples Received at UBTL January 3, 1984

## Date(s) of Analysis

## Comments

Analyst

## Reviewers

Laboratory Supervisor

Reactivity

83-090

Cadmium 83

1.5

$\frac{32}{45}$

48%

Lead 85

6.7

$\frac{1340}{2500}$

54%

Lead 86

1.1

$\frac{25}{45}$

51%

Lead 87

0.7

$\frac{380}{550}$

65%

83-092

Cadmium 88

2.87

$\frac{184}{445}$

38%

Lead 89

3.8

$\frac{520}{1070}$

48%

83-093

Cadmium 84

1.79

$\frac{75.6}{46}$

33%

Lead 85

3.4

$\frac{1340}{1790}$

51%

83-094

Cadmium 96

1.05

$\frac{25}{46}$

46%

Lead 1420

47

$\frac{940}{1420}$

66%

83-090

Cadmium 85

1.5

$\frac{36}{85} =$

42%

Lead 250

67

$\frac{1340}{2500} =$

54%

83-091

Cadmium 45

1.1

$\frac{24}{45} =$

53%

Lead 1350

44

$\frac{580}{1350} =$

43%

83-092

Cadmium 48

.97

$\frac{15.4}{48} =$

32%

Lead 1170

29

$\frac{560}{1170} =$

48%

83-093

Cadmium 54

1.79

$\frac{15.4}{54} =$

28%

Lead 1340

34

$\frac{560}{1340} =$

42%

83-094

Cadmium 46

1.05

$\frac{21}{46} =$

46%

Lead 1420

47

$\frac{940}{1420} =$

66%

# Office Memorandum

STATE DEPARTMENT OF HEALTH  
AND ENVIRONMENTAL SCIENCES

TO : Files

DATE: 12/2/83

FROM : Hal Robbins *Hal Robbins*

SUBJECT: Summary of blood-lead results for East Helena

The following is a brief statistical summary of the results of the East Helena blood-lead study conducted in August, 1983. The results are only for the children in both the test (Area I and II) and control (Area III) areas. The children were all between the ages of 1 and 5 (inclusive) and the drawing was voluntary. Area I is defined as the area within 1 mile of the ASARCO smelting complex. Area II is the area within 2.5 miles of the ASARCO smelting complex, but does not include Area I. Area III is a control area in the town of Helena near the Bryant school. For more details of the areas, methodologies, and the like, please refer to the protocol.

Blood lead results are reported in micrograms of lead per deciliter of blood.

Mean per Area		
<u>Location</u>	<u>Mean</u>	<u>Number of children sampled</u>
All Areas	9.8	420
Area I	13.1	87
Area II	9.5	250
Area I & II	10.4	337
Area III	6.6	69

RECEIVED

MAY 24 '84

WASTE MGT. BR.

## Distribution by Area

	<u>0 - 10</u>	<u>11 - 20</u>	<u>21 +</u>
Area I	40%	48%	12%
Area II	66%	31%	3%
Area III	96%	4%	0%

numbers represent the percentage of occurrence within each area by lead concentration range.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

10/31/85  
NPL-04-3-47

OCT 31

OFFICE OF  
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Meeting with Staff Representing Senator Jake Garn  
Regarding the Silver Creek Mining, Utah Site

FROM: C. Scott Parrish, Chief  
National Priorities List Section

TO: Record

On October 15, 1985, Walter Kovalick, Deputy Office Director, Office of Emergency and Remedial Response, Ron Bachard, Office of Comptroller and Scott Parrish met with Robert Wiedner and Stephan Kohashi of Senator Jake Garn's staff. The purpose of the meeting was to discuss the NPL process and the status of the Silver Creek Tailings site. In addition, Senator Garn's staff provided a package of information concerning the site (attached).

Mr. Kovalick initiated the discussion by stating that EPA could not discuss HRS scoring issues related to this site because the proposed rulemaking to add the site to the NPL is currently in the public comment period following its proposal in the Federal Register on September 18, 1985.

Garn's staff stated that they were concerned about the stigma associated with the proposed listing. Mr. Kovalick explained the overall Superfund process and described the purpose of the NPL.

Garn's staff asked if objective information was used in preparing the HRS score. Mr. Parrish stated that factual information is used as input to the HRS.

Garn's staff asked if there was a financial incentive to listing a site on the NPL. Mr. Kovalick stated that listing on the NPL makes a site eligible for remedial planning activities.

Garn's staff stated that the Governor is interested in removing the site from the list. Mr. Kovalick stated that the Agency will review comments received and determine if the site should be placed on the final NPL.

Garn's staff asked what the Baucus amendment contained. Mr. Kovalick stated that he would research the question and call with an answer.

Garn's staff indicated that the Park City, Utah was interested in participating in a study to accelerate the process. Mr. Kovalick stated that the City should coordinate efforts with the State and EPA Region VIII. Mr. Kovalick reminded the representatives that the HRS uses specific information to develop a score. Special studies on health affects or other non-HRS factors would not be used to determine the final HRS score and the Agency's decision to list the site on the NPL. Mr. Kovalick went on to explain that incomplete remedial actions are not accounted for in HRS scoring.

Garn's staff asked what the schedule was for RI/FS studies at the site. Mr. Kovalick replied that to the best of his knowledge, the RI/FS was scheduled for the third quarter of FY'86.

cc: Walter Kovalick  
Ron Bachard

*Prof. W. J. ...  
...  
...*



Office of City Manager

*Attachment*  
SEN. JAKE GARN  
OCT 2 1985  
SALT LAKE CITY, UT

September 27, 1985

The Honorable Jake Garn  
United States Senate  
125 South State  
Salt Lake City, Utah 84101

Subject: Superfund Listing of Silver Creek (Prospector)  
Mine Tailings Site

Dear Senator Garn:

Park City has been dealing with the EPA and the potential of being placed on the Superfund List for more than two years. Now that we have been listed, I am more convinced than ever that the entire ranking, study, and clean-up process is fundamentally unfair. I went to the State Health Department assuming that they could provide the technical expertise necessary to set standards for development activity in mine tailings areas. The State Health Department within 48 hours of our request, had brought in the EPA Regional Superfund officials. Since then, we have fought a process based on the presumption that a health hazard exists. Quite the contrary to being "innocent until proved guilty", the procedures require that we prove why we should not be on the Superfund List. EPA does not, even in the most general way, explain what standards would be used to determine that a health hazard exists. Now we find that a "potential" hazard based on no data at all is sufficient evidence to warrant being listed.

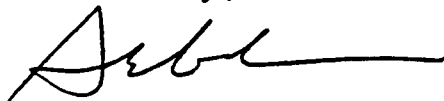
I am convinced that the Superfund Program has become a bureaucratic "success" through a consciously designed structure that controls information. No guidance whatsoever is provided to a potential Superfund candidate to assist them through the steps that are taken to get a site on the Superfund List. In fact, the Regional Director in Denver for the Superfund described the process as a "black box". Information is submitted and after many months (and in our case years later), a Federal Register Publication announces the community's score and ranking on the most dangerous sites in the country list. The only way out at that stage is through the sixty day comment period. Even J. Winston Porter, the National Director of the Superfund said publicly

that he was confident that Prospector would remain on the List after the comment period. Other EPA officials have admitted off the record that the process doesn't work. Once on the List, it is virtually impossible to be removed, because there are no standards in the first place -- so it is not possible to effectively rebutt the listing, and secondly (according to the rules) no new data can be considered. Just obtaining a response to the data submitted in the sixty day comment period is very difficult to obtain. Of some 250 sites that were proposed last October, no one has received a response to the comments they submitted a year ago, and so they remain in limbo without knowing what the future holds. We don't want to find ourselves in that same position a year from now.

There are two ways in which you could be of great help to Park City. First of all, you could assist us with the information control problem. We have repeatedly asked for information critical to our submitting a good case at the comment stage -- not the least of which is EPA's own files on how they could have ranked Prospector as they did based on the erroneous and statistically invalid data that was used to put us on the list in the first place. We were listed in the Federal Register as of September 18, 1985. You could help us get information now before times runs out, that we have been unable to obtain on our own.

Secondly, the only way that the Superfund expenditures, sloppy procedures, and arrogant attitude toward communities forced to deal with the EPA are going to be changed is through congressional action. We want to be of any help that we can with respect to the Baccus/Garn amendment and it is fair implementation. If once you have reviewed all of our information, you are comfortable with the position we are taking, Park City would very much appreciate your independent input to EPA during the 60 day comment period.

Sincerely,



Arlene Loble  
City Manager

attachment



A REPORT TO THE UTAH CONGRESSIONAL  
DELEGATION ON EPA ACTIVITIES  
IN PARK CITY, UTAH

The purpose of this report is to explain why Park City must oppose inclusion of Silver Creek/Prospector on the Environmental Protection Agency's National Priority list of Superfund sites.

There are seven reasons for the City's opposition to listing Silver Creek/Prospector on the NPL:

1. There is no ascertainable health hazard in the Prospector area. In scoring the Prospector area for inclusion on the NPL, unscientific, sloppy and biased methods and data were used by the State Health Department and accepted by the EPA. Although this data has been technically refuted according to EPA rule, no new data can be considered. Even where no data exists our site will remain on the list based on potential (conceivable) but totally undocumented health risks.
2. The track record of the EPA in cleaning up Superfund sites is dismal at best. To our knowledge none have been cleaned up with Superfund monies. We have asked the EPA for documentation, but have received none, of other mine waste sites. We believe that not only have none been cleaned up, but no mine site even has an approved plan for cleanup.
3. According to EPA officials, the homeowners and property owners are legally liable for the costs of both the study and cleanup as responsible parties, even though these people bought the property only to build homes and businesses. We believe, but cannot confirm, that the few sites that have been or are being cleaned up have been at the owners expense based on Federal and/or State legal action. No Superfund money has been spent on cleanup.
4. The EPA has no standards for what level of mineralization is hazardous. Therefore refuting the listing is technically impossible. EPA's position is that once on the list Federal monies (at an average cost of \$460,000 per listing) can be used to determine if a hazard exists, and if so what to do about it.

5. The EPA is without authority to regulate mine waste sites such as Prospector/Silver Creek and Congress has specifically mandated that the Department of Interior under its Surface Mine Control and Reclamation Act of 1977, (SMCRA) is the proper agency to evaluate Prospector/Silver Creek and effect and cleanup. According to the SMCRA study Prospector/Silver Creek presents virtually no hazard for air, surface or ground water contamination.

6. If Prospector/Silver Creek is listed on the NPL the listing will result in a taking of property without just compensation and denial of due process rights.

7. The rules used in the review of information submitted during the commend period are so unfair as to make it impossible to successfully protest a listing.

#### BACKGROUND

The site proposed by the EPA for inclusion on the NPL (Silver Creek, known locally as Prospector) is the remnant of an old tailings pond used around the turn of the century. The dry tailings pond was first brought to the attention of Utah State Health Authorities by Park City. We asked the Utah Geologic and Mineral Survey (UGMS) to work with us on a consulting basis on the preparation of an ordinance dealing with development on sensitive lands. Everyone recognized that the dry tailings pond was a different soil condition from that generally existing around town, and we were concerned that there may be problems with building on the tailings. It was the determination of UGMS that the tailings pond area had high concentrations of lead, cadmium, arsenic, and some other metals. Of course that was not surprising, everyone knew the area was a dry tailings pond. With the data from the UGMS study, we contacted the State Health Department and asked them to review that information for possible health hazards. From the time that information was given to the State Health Department to the time EPA Superfund people were involved was less than forty-eight hours.

#### How We Got Proposed for Superfund's NPL List

The hazard ranking score (HRS) given to Silver Creek/Prospector is 38.4. In order to be placed on the NPL a site must score a minimum of 28.5. The maximum score obtainable is 100. Only two areas, ground water release and surface water release received scores. The increase of ground water was based solely on potential hazards no data was considered. Airborne release received a zero score.

#### Airborne Release

According to State Health Department personnel, the primary health concern was air borne transmission of the tailings material. The State did a series of blood tests on Park City area children. Tests were done both in the early spring, when exposure was expected to be low due to the covering of the tailings with snow, and in the fall when the exposure to the tailings would have been high. The results of the blood tests revealed no widespread health problem. The blood lead levels of all but four children were found to be within the normal range. Three of the four children, with elevated blood lead levels, were from the same family and when private tests were done at Primary Children's Hospital the levels of lead in the blood had inexplicably dropped to the normal range. The fourth child was found to be sleeping in an antique bed painted with lead based paint. When the bed was removed the level of lead in that child's blood returned to normal. The EPA considered one test invalid and ranks air borne release with a score of zero.

#### Surface Water

Although several surface water samples were available, the State Health Department submitted a single sampling. (Other samplings including one taken in September of 1985, indicate that the lead content of the waters of Silver Creek is actually higher upstream of Prospector than downstream.) The City was given no opportunity for input.

This sample submitted for the Hazardous Ranking System (HRS) was taken by the State Board of Health in December of 1984. This consisted of one sampling taken above and below the tailings pond. Silver Creek is an intermittent stream and normally would have ceased flowing by December. Any water in the stream would have been frozen, with the exception of any flowing water would have entered this intermittent stream through the City's storm drainage system. This single sampling was the basis of the surface water scoring that when coupled with the ground water score, ground water score based on no data at all, and contrary to tests of the wells in the area, resulted in Park City's nomination to the list.

In a public hearing on the nomination to the list held on September 12, 1985 in Park City, William Giese of Region 8 of the EPA indicated that he would not consider one sampling to be statistically significant. He also said that it would not even be considered by EPA if that same test had been offered by a third party to show that no hazard existed. EPA has admitted that

the "snowball" test is of little or no scientific value. Nevertheless, the snowball sampling was the basis of Park City's inclusion on the nomination list for surface water release. There was no discussion about the effects of evaporation concentrating the total dissolved solids in the sample taken. We do not believe the melted snowball to be an accurate reflection of the general conditions, nor to be a realistic tool in determining whether the Prospector site rises to the level of Superfund consideration. Obviously there are serious flaws in EPA's quality assurance protocol. According to Mr. Giese, there are two quality assurance tests to make certain that samples are accurate reflections of sites. Obviously EPA's quality standards are extremely poor, yet they will not consider during the review and comment period any new data.

#### Ground Water

There is a fairly substantial body of data known or available concerning the ground water in the area immediately surrounding the tailings pond but it was not used in the HRS ranking. Records of the Utah State Engineer's office indicate that there are thirteen culinary water wells within a radius of two miles downstream of the pond. Some of these wells are public water supply systems subject to regulation by the State Health Department, and routine test data on those wells is available in the files of the State Health Department. All of these wells subject to regulation have consistently passed all State water quality standards. The State Health Department did not provide this information to EPA in scoring this site, infact no data was used to determine our ground water score.

#### What Park City Has Done to Solve the Problem

Because the initial concern over the tailings pond area dealt with fugitive dust and air borne transmission of the heavy metals, Park City in cooperation with the property owners in the residential and commercial subdivisions built on top of the former tailings pond, have spent over one million dollars in an attempt to eliminate any potential problems. The actions taken include the importation of a six inch top soil cap, planting of grasses and other plant materials that were designed to be rooted only in the top soil layer and not to extend into the tailings, so there is no systemic transmission of the tailings material to the surface by the plantings. We have also made storm drainage improvements so that very little of the normal rain fall or snow melt on the Prospector area would percolate through the tailings, but rather is caught in

storm drainage and is transported in closed pipes to the natural channel Silver Creek. The channel of Silver Creek is also being improved with a rock rip-rap to eliminate stream bed erosion or collapse of the banks of the stream. We have a detention basin under construction at the outfall point. This work was undertaken at the request of area property owners who were concerned about eliminating any possible health hazard, and with the blessing and encouragement of the Utah State Health Department.

According to comments made by Mr. William Giese at the September 12th meeting in Park City none of the improvements will be considered by EPA in reviewing the scoring sheet and the nomination of the Silver Creek/Prospector area to the National Priority List. He could give no reasons why the substantial changes made in the conditions on the site would not be considered by EPA, but indicated only that it did not matter what we did locally to solve the problem. It follows from this line of reasoning that we could have physically removed the tailings to another site and eliminated their presence entirely, and still have EPA studying a situation that no longer existed. We are very confused why the work being done by the area residents and the City is not being considered in evaluation of any potential health hazard. At the minimum, a new scoring seems necessary on the basis of the present conditions.

#### Nearby Tailings Area

Less than a mile downstream from the abandoned tailings pond at Prospector, which has now become a residential subdivision, there is a much larger tailings pond known as Richardson Flats owned and operated by United Park City Mines under the terms of a discharge permit issued by the Environmental Protection Agency. The two ponds are substantially identical. It is our understanding from the United Park City Mines discharge permit that no clay lense or other impervious seal was required under the United Park City Mines pond. In fact our testing of surface water after passing by Richardson Flat shows an increase in lead of ten times. This apparently is of no concern to the EPA which samples Richardson Flat regularly.

It is extremely confusing to the residents of Park City why the two operations, which for all practical purposes appear to be identical, are being treated so dissimilarly. The United Park City Mines pond is being operated under an EPA permit designed to their specifications and being operated to their satisfaction. The Prospector pond is less than a mile

upstream in substantially identical soil conditions is being condemned as a hazardous waste site. It is impossible for us to reconcile the different treatment between two adjoining and identical operations.

It is the position of Park City that the scoring performed by Utah State Health Department and EPA officials on the basis of the melted snow ball is such a sloppy and statistically inaccurate or insignificant manner of sampling that the entire scoring process must be thrown out. The ranking and scoring performed by the State Board of Health and the EPA ignores the readily obtainable information discussed in this letter. Much of this information is available in the State's own files had they looked. The data we have been able to obtain from existing well samples and existing data on file with State and Federal officials indicates there is no ground water migration of heavy metals from the tailings pond area, and that the only justifiable concern was air borne dust which EPA ignored. Park City and its property owners have, through their own efforts, eliminated the air borne dust problem. There is no other evidence available to suggest there is any further action necessary.

#### EPA Track Record

We have continually asked the EPA for information regarding their actions on similar sites. According to EPA's own publication, National Priorities List, 786 Current And Proposed Sites By Order of Ranking and By State, October 1984, no sites have been cleaned up with Superfund monies, only those sites where responsible parties can be found are cleaned up by using funds of responsible parties. Our study has revealed no mine waste sites have ever even reached the stage of a feasible plan for remedial clean up action let alone actually performing clean up action.

Another site in Utah, the Midvale tailings site owned by Sharon Steel Corporation, is a good example. A year has passed since proposing the Midvale site and 247 others across the Country for the NPL. No action has been taken to either place Midvale or any of the other 247 proposed sites on the NPL or drop them. Sharon Steel Corporation made timely comments during the sixty day comment period but has received no response. The Midvale site is simply sitting in limbo with no EPA action.

#### Liability

A major portion of Superfund Law 42 USCA §9601 et seq, the Comprehensive Environmental Response and Liability

Act of 1980 (CERCLA) attaches liability to any responsible party for cost of cleanup and damage to natural resources. The category of responsible parties is very broad indeed, and includes not only waste generators, transporters and owners of waste facilities, but also anyone who obtains the real property where waste has been dumped. Mr. Giese of Region 8 EPA has acknowledged that it is the opinion of EPA attorneys that the homeowners in Prospector are legally liable for the cost of any cleanup.

It is very sobering to realize that innocent people who purchased homes and businesses in Prospector and did not dump any tailings or have any financial interest in the tailings may be held liable by the EPA for the cost of any cleanup. All cleanup on every site cleaned up has been funded as a result of legal action by the State or Federal Government.

#### EPA Standards

Simply put, there are no EPA standards for what is safe and unsafe. The EPA is proposing a very costly study of Prospector but cannot say if they find something whether it is safe or unsafe. It only seems fair that the property owners should know up front what is considered unsafe if it is found.

The City believes that the EPA has no standards because the lack of standards frees the EPA to declare whatever is found a health hazard. It gives the EPA unfettered discretion to do anything it would like.

#### Mine Waste Sites

EPA has seized jurisdiction over mine waste sites without authority and in defiance of its limited legal authority. Congress specifically exempted mine waste (42 U.S.C. Sec. 9601 (14)(c)) from CERCLA. It is apparent that the catch all provision giving EPA authority to respond to "pollutants or contaminants which may present an imminent and substantial danger to the public health or welfare (42 U.S.C. 9604 (a)Sec. 9605) is not intended to override the exclusion of mining wastes, notwithstanding the presence in mining wastes of any constituent hazardous or toxic chemical (Senate Report No. 848, 96th Congress, Second Session 28 (1980)).

More importantly, the EPA has failed to make a prima facie showing that the Prospector/Silver Creek site poses an imminent and substantial danger to the public health or welfare. The tailings have been in place for

over 50 years without a single incidence of endangerment to the health of any person.

On August 3, 1977, Congress passed Public Law 95-87, Title IV (Surface Mine Control and Reclamation Act of 1977 (SMCRA) of which is directed to abandoned mine reclamation. Although these provisions generally pertain to coal mining, certain provisions of this Title cover reclamation of non-coal mining sites as well (30 U.S.C. Sec. 1239, 1240, 1242). This legislative framework provides the standards and funding mechanisms by which sites such as Prospector/Silver Creek should be dealt with if any hazard is shown to exist. In 1977, Congress provided the Secretary of Interior with the sole authority to regulate past, non-coal mining waste sites and preempted the EPA from regulating this area.

In Utah the State Division of Oil, Gas and Mining administers the SMCRA program. The Utah Division of Oil, Gas and Mining has made an extensive study of mining sites within the State of Utah and has adopted an extensive mine reclamation plan in accordance with the framework passed by Congress.

They have reviewed some 1,100 sites, and out of those sites the Prospector area ranked near the bottom of their list. The sites listed under SMCRA as being higher priority or more serious problems have not in most cases been considered by the State Health Department or EPA. We believe the SMCRA ranking system to be generally valid, and cannot understand why the HRS ranking system is so dissimilar from that used by the Division of Oil, Gas and Mining under SMCRA. Further, because of the mining activity the Park City area is probably the best known geologically in Utah. If there are any mine waste sites tailor made for SMCRA action, Prospector/Silver Creek is certainly one.

#### Position of OMB

The Office of Management and Budget refused to allow mine waste sites to be placed on the NPL from October 1984 until September of this year. It was OMB's position that SMCRA was better suited to handle mine waste sites and that the EPA was not able to effect the cleanup of mine waste sites.

Since Mr. David Stockman has left office the, EPA successfully lobbied to have mine waste sites included in its jurisdiction.

We believe the objections raised by OMB during Mr. Stockman's tenure were and are valid and should still

prevent EPA from listing mine waste sites on the NPL. EPA's effort to regulate Prospector/Silver Creek duplicates the Utah Abandoned Mine Reclamation plan established pursuant to the direct mandate of Congress. This comprehensive program for the reclamation and restoration of abandoned or inactive mining sites preempts the authority of the EPA to regulate mining wastes.

### Unconstitutionality of EPA's Actions

CERCLA as applied by the EPA constitutes a taking of property without just compensation and violates the prohibitions contained in the Fifth Amendment to the Constitution. (Pennsylvania Coal Company vs Mahon, 260 U.S. 393 (1972)). If Prospector/Silver Creek is placed on the NPL the EPA will have effectively taken all of the value of the property in the Prospector area. Through the efforts of the EPA a listing on the "Super Fund" list indelibly links the site listed with Love Canal and Times Beach. When coupled with impending liability for cleanup which attaches to any owner of the property, all value is removed. The concept of taking through governmental action is rapidly becoming recognized throughout the country (Williams on County Regional Planning Commission vs. Hamilton Bank of Johnson City, 53 LW 4964 (June, 1985)).

Additionally the placement of sites on the NPL is a rule making procedure of the EPA. Sites are first proposed and listed in the Federal Register, a sixty day comment period follows before any action is taken. The purpose of the rule making procedure is to assure that affected parties are given their due process rights guaranteed under the Fifth Amendment. Unfortunately, it has become obvious that the rule making procedure is a mere formality. Comments by affected and interested parties opposing a listing are ignored by the EPA. Assistant EPA Administrator J. Winston Porter was quoted in the September 6, 1985 Deseret News as saying, "he's (Porter) is confident the Silver Creek area will survive the comment period." This statement was made prior to even the submittal of any comments. It is obvious that the rule making procedure is a mere sham and if a site is proposed the EPA acting as advocate and judge will not consider comments made by other parties.

The deprivation of due process is compounded by lack of standards discussed earlier. Ken Lloyd of EPA was quoted by KPCW radio as saying, "It's probably true that we (EPA) don't have any standards for these types of sites and without a standard the City is left shooting at a moving target." Because there are no

standards for what is hazardous, affected property owners cannot respond effectively and thus are further denied their due process rights.

#### What Should Be Done

Park City does not take the public health considerations lightly, and it was the City that initiated the review of this situation. We believe that common sense dictates continued monitoring of the downstream wells so that any indication of downstream migration can be detected. The tailings pond has existed for almost eighty years, and it seems likely that if ground water migration were going to occur, it would have occurred by now and be detectable. The residential and commercial development resulted in a substantial portion of the surface area of the pond being covered with streets, roofs, and parking areas. The City improvement district will have capped the entire area, including vacant lots with topsoil eliminating any air borne hazards. We believe that consideration of the Prospector/Silver Creek area for nomination to the Superfund program on the basis of the reckless, unscientific, and sloppily gathered data by the State Health Department is a grave injustice and disservice to the citizens of the community and the State of Utah. The level of public concern over the possible health hazard is substantially greater than any of the scientific data would suggest is reasonable. We recognize there may be some potential public health problems, but think that considering the area for the National Priority List exaggerated the severity of the those concerns. We also believe that the Superfund program's track record on mining sites suggests that it will take longer to resolve the questions concerning a possible health hazard with the "help" of the EPA than it would if we acted independently.

It has become obvious to Park City that the EPA Superfund process is seriously flawed, the HRS ranking system is severely biased so that any and all sites will receive a scoring which will put the site on the NPL. Even though conditions may change the EPA does not listen to comments and technical data provided once a site has been proposed for the NPL. EPA official Ken Lloyd admitted that the EPA does not listen to outside information and will not rescore a site. These comments are borne out by the fact that less than two per cent of sites proposed are dropped from the NPL.

The Utah State Health Department when confronted with the information found in this report reversed its earlier position and now opposes the listing of Prospector/Silver Creek. Unfortunately, this change of

position is unpersuasive to the EPA. EPA official Lloyd stated publically that this situation is similar to Aspen, Colorado where the State didn't support the listing but that didn't sway EPA's view of it.

Major changes are needed in Superfund law and regulations. Sites should not be proposed until adequate information is gathered by local and State officials to substantiate a public health problem. A ranking system should be devised which is unbiased and truly ranks sites according to the health hazard existing. The listing process should be open and fair. The EPA must be required to listen to and consider comments and outside technical data. The EPA should be required to respond to comments in a reasonable time and not let sites languish for months and years. Tax dollars should not be wasted by having overlaps between Superfund and SMCRA. Only one agency should have jurisdiction and response authority.

Finally, the EPA should be prevented from violating constitutional rights, guaranteed all citizens, and making innocent landowners liable to repay for costs of action by the EPA. What the EPA is allowed to do is to presume someone guilty until they can prove their innocence. Unfortunately, the pleas are falling on deaf EPA ears.

May 17, 1984



# The Park Re

Vol. 105, No. 15 • 2 Sections, 32 Pages • Thursday, Ma

## First Prospector blood survey shows no dangerous lead levels

by Christopher Smart

Although results from blood tests on Prospector Square children have not been formally released pending notification of the parents, one researcher told the Record no instances of abnormally high lead contamination from area tailings were revealed from the first of two scheduled surveys.

According to Ed Stafford, a researcher with the Rocky Mountain Center for Disease Control, the testing showed the children's blood lead levels to be below what the National Center for Disease Control considers to be dangerous. The findings were expected by health officials because the tailings on which Prospector Square is built have been covered by snow all winter.

Stafford is conducting the study for

the Rocky Mountain Center in conjunction with the Utah Department of Health. He said the children's blood lead levels will be checked again at the end of summer to determine if, by coming in contact with dust in the area, they absorbed lead into their bodies.

The results from the second test will provide a "powerful study in terms of cause and effect," Stafford said. He explained that to this date no such studies have been conducted. Other blood lead level studies, most notably those from Kellogg, Idaho, and Butte, Montana dealt with lead ingested through the lungs. Both of those communities are built around smelters.

According to Ken Alkema of the State Department of Health, prelimi-

nary evidence from those studies demonstrates that the lead in the blood of the surrounding population was not absorbed through the soil but through the air.

Stafford, however, is more skeptical. He maintains that those studies dealt with lead oxide in the air while the Prospector tailings contain lead in another form. Whether that lead is a health problem is yet to be determined, he said.

According to Dr. Dennis Perrotta of the epidemiology division of the Utah Department of Health, Prospector parents whose children took part in the testing should receive the test results in the mail sometime late this week.

He added that after the families had received the test results those findings

would be made public.

Thirty-eight children from Prospector Square were tested, Perrotta said, along with nine children tested who lived outside the Prospector area. He added that cooperation from the participants was excellent.

The mine tailings under Prospector Square first gained attention as a possible environmental and health problem in November, following a soil analysis by the Utah State Geological Survey.

Prospector Square was once a tailings pond for Park City mining interests. The Geological Survey released findings showing abnormally high levels of arsenic, lead, cadmium and zinc in area soils.

May 29, 1981

# Official results show Prospector lead levels equal national average

by Christopher Smart

Official results from a survey conducted to test contamination from Prospector Square tailings released today by the Utah State Department of Health reveal that average blood-lead levels in 38 Prospector children are equal to the national average.

Dr. Dennis Perrotta, coordinator of the Epidemiological Studies program for the State Health Department, said the average blood-lead level in Prospector Square children was 10 micrograms of lead for every 100 c.c. of blood—exactly the national average.

The National Center for Disease Control in Atlanta, Ga. sets the level at which action should be taken to remove a lead source at 30 micrograms, Perrotta said.

The lowest level found in the 38 children studied was 5 micrograms while the highest was 16, Perrotta said. No instances of abnormally high lead contamination were found, he said.

While the results from the Prospector children tested were deemed average, findings from blood samples taken from nine children outside the Prospector Square area were even lower, Perrotta said. The average of the children tested who reside outside of Prospector Square is seven micrograms, he said. The difference, however, is not "statistically significant," Perrotta maintained.

Health officials did not expect to find any abnormally high blood-lead levels at this time, Perrotta said, because the tailings on which Prospector Square is built have been covered by snow all winter.

Blood samples will be taken again in September to determine if contact with the dust from the tailings is causing lead contamination in the children, Perrotta said. "Low results in September would lead me to generally conclude that lead exposure of any health significance is not related to living and playing in Prospector Square," he said.

During the next week, the Division of Environmental Health will be collecting dust samples from several homes in Prospector, according to Perrotta. "We would like to compare blood-lead levels to dust samples and playing and eating habits," he said.

The Health Department will be able to "draw conclusions" from the comparisons, Perrotta said. In February, Prospector Square parents were interviewed to determine their children's playing and eating habits.

The mine tailings under Prospector Square first gained attention as a possible environmental and health problem in November of 1983 following a soil analysis by the Utah State Geological Survey.

PARK RECORD  
11-8-84

## Prospector tailings pose no 'imminent hazard,' state says

by Christopher Smart

The Utah Department of Health, following blood tests on Prospector Square children between the ages of five and 12, has determined that no "imminent health hazard" exists from the tailings upon which the development is built.

However, in the analysis of Prospector blood lead levels, Dr. Dennis Perrotta, coordinator for the Epidemiological Studies Program, found that three children among the 48 tested had blood lead levels above the "action level" set by the National Centers for Disease Control.

A fourth child was found to have "elevated" blood lead levels which

fell short of action level.

According to the National Centers for Disease Control, action level, a rating of 25 micrograms of lead for every 100 cubic centimeters of blood, is the point at which an environmental hazard should be reduced or eliminated.

"The presence of three children that exceed acceptable limits suggests the potential for excessive lead uptake in certain situations," Perrotta said.

He added, however, "the general lack of significant increase in the average concentration of Prospector Square children indicates that there is no imminent public health hazard present."

The average blood lead concentrations for 38 children tested in Prospector Square last April was 9.5 micrograms for every 100 cubic centimeters of blood. The October average for Prospector Square children was 10.5 micrograms. The national average is 10.0 micrograms.

The average for 19 children tested outside the Prospector area is 9.5 micrograms. Their springtime blood lead concentration average was 7.5 micrograms.

Health officials did not expect to find high readings in April because the Prospector soil, made up of old mill pond tailings, had been covered

### Prospector to B1

#### Prospector from front

by snow all winter. However, those tests revealed that one child had a rating of 29 micrograms of lead for every 100 cubic centimeters of blood.

October's tests were designed so that investigators could compare levels following children's exposure to Prospector soils over the summer.

Beyond the tailings, the Utah Department of Health has "not identified" any other source of lead in the Prospector area, according to Perrotta. The increase in three children's blood lead level is "meaningful and worrisome" Perrotta said.

"We don't know that those kids are doing anything differently than the others."

Perrotta said the health department would like to study further the immediate environments of the children with elevated blood lead concentrations to determine where they are making contact with lead.

And while the children with high blood lead levels have concentrations ranging from 21 to 32 micrograms, Perrotta maintains that they are in no immediate danger. The level at which children should be medically

treated is around 50 micrograms, he said.

Concerning the concentrations found in the four youngsters with higher-than-average ratings Perrotta said, "It is not inconceivable that subtle changes to physical and mental development could occur, but that likelihood is very small."

Health officials became alerted to the high levels of lead in Prospector Square following a November, 1983 soil study by the Utah Geological and Mineral Survey. The first of the two Prospector Square blood studies was launched in April.

According to Perrotta, the next step in the investigation will be to compare blood screening results with environmental data collected during the summer by the health department's Division of Environmental Health.

The health department will then make "recommendations to Park City citizens and officials concerning any action needed to insure the health of the public," Perrotta said.

The recommendations will be made at a town meeting Nov. 13 at 7:30 p.m. at the Prospector Square Conference Center.

## In our opinion

The Mountain West's first newspaper

# DESERET NEWS

Founded June 15, 1850 Salt Lake City, Utah

## Park City is hazardous? Evidence woefully short

If Park City's Prospector Square is rated such a dangerous place to live that it ranks in the top 50 in the U.S. qualifying for toxic waste cleanup, then someone should examine the criteria more closely.

Look at the scanty evidence to date. If the "high levels" of lead, cadmium and arsenic on an old mill tailings site are so dangerous, they would show up quickest in youngsters living in the area. Yet health tests to 22 children showed only four had lead levels in their blood slightly above new federal standards.

Even the levels in those four children are suspect. One youngster, an infant, had been sleeping in an antique crib painted with lead-base paint — which might account for the higher than usual lead level. The other three were tested by an independent laboratory within a month of the first test, and lead levels were no longer high. A doctor for the Park City Board of Health concluded that one of the two tests had to be wrong, because lead levels could not have dropped that rapidly.

Or high toxic waste levels could quickly contaminate any water in the area. That, too, has not been the case in Park City. Studies done in conjunction with the State Health Department indicate trace levels of lead that may pose hazards for aquatic life — but still not high enough to be dangerous for culinary purposes. A deep well in the affected area was tested and found clean. But that well isn't even currently used in Park City's culinary system.

More than 100 tests of water from 13

wells in the Park City area show no pollution from tailings, says the city's chief building inspector. And State Rep. Glen Brown of Coalville, whose district includes Park City, asserts that only one water sample was taken before the area was added to the national priorities list.

Furthermore, Park City property owners have taken it upon themselves to tackle the cleanup problem. They have formed a special improvement district to cover all vacant lots and any exposed ground in the entire subdivision with ground cover. That project is almost finished. It should prevent dust blowing around from any contaminated tailings, or children playing on contaminated ground. And there's no problem from radiation.

So why spend perhaps \$300,000 of scarce federal money — the amount of Superfund money being sought — to "clean up" Park City? City officials don't want it, because it unfairly stigmatizes their city as a dangerous place to live. Most residents don't want it, because property values are depressed by the link with toxic wastes. It's difficult to find anyone close to the problem who actually believes it's serious enough to warrant spending the thousands of dollars necessary for extensive water and soil testing and other "cleanup" costs.

If water pollution and exposure to lead tailings were actually a health hazard, by all means the Silver Creek mill tailings site should be cleaned up. But the evidence of such a hazard is woefully inadequate to date.

## State will ask EPA to drop Park City site from its list

State officials will ask the Environmental Protection Agency to remove a Park City site from the federal Superfund toxic waste cleanup list, arguing that until more information is available it is inappropriate for the site to be on the list.

The EPA placed the Silver Creek Mill tailings site, used for construction of Prospector Square, on the Superfund list. The EPA rundown lists,

by highest priority, the nation's most hazardous waste problems. The fund includes millions of dollars to clean up hundreds of hazardous waste sites in the United States.

Following a closed meeting Monday with Gov. Norman H. Bangerter, Kenneth Alkema of the Utah Division of Environmental Health said Dr. Suzanne Dandoy, Utah Department of Health executive director, will ask the

EPA to remove the Silver Creek tailings from the list. Dandoy will tell the federal agency her request has Bangerter's backing.

Alkema said the tailings problem was prematurely put on the Superfund list because nobody knows what effect the tailings have on the area's groundwater. He said there was concern the tailings would be harmful to anyone touching them, so half of the 60 acres have been covered with dirt.

"Once you get on the Superfund list, you get a reputation as being a terrible problem, and that can't be deleted until we get more information about the contaminator," Alkema said.

# EPA proposes to include Park City mill tailings on Superfund Priorities List

The Environmental Protection Agency proposed Thursday to add Park City's Silver Creek mill tailings area to the Superfund National Priorities List, a move that, if finalized, will open the way for federal funding of contamination studies and cleanup.

The announcement opens a 60-day public comment period, after which the EPA administrator will decide if the site will go on the list.

The proposed site was one of 38 added nationwide in the EPA's fourth list update. The list now includes 850 final and proposed sites.

The Silver Creek site is a residential and commercial area built over a disposal area for tailings from mining activities dating back to the late 1800s.

The area includes the Prospector Square subdivision, where blood tests of 22 children last year showed elevated lead levels in four youngsters.

One child was later found to have been sleeping in a crib painted with lead paint, and subsequent tests showed normal lead levels in the other children, so some Park City officials have argued that the threat has been overblown.

Rep. Howard Nielson, R-Utah, who is on the Superfund oversight committee, held a town meeting in Park City on Aug. 31, and residents voiced strong feelings that the Superfund listing is unnecessary and harmful.

"There is concern that the health hazards have been greatly exaggerated and that inclusion on the national priority list will adversely affect tourism and property values in the area," he said.

Nielson said he'll work closely with the EPA and the state to ensure that the Park City people's concerns are addressed.

Earlier this year, area residents formed a special improvement district to deal with the problem, and Park City has issued a contract to grade and contour portions of the site and add 6 inches of clean topsoil to exposed tailings areas.

Commenting on the EPA announcement Thursday, Utah Health Department officials said the city's voluntary action was an appropriate step to reduce potential health risks, but further study is still needed.

The tailings contain lead, cadmium, arsenic and other metals that might pose a long-term threat to ground and surface water resources, although no evidence of contamination to drinking water has been found, the officials said.

Environmental Health Division Director Kenneth L. Alkema said, "This is the only way we can obtain funding to finish our evaluation of the area and resolve the question of whether there is a long-term threat to public health and the environment from the site."

State health officials met with Park City officials Thursday to explain the reasons for and implications of the listing.

"We will continue to involve the residents and city officials throughout the process," Alkema said.

Thursday's announcement brings to nine the number of Utah sites proposed for the list. One site — the Rose Park sludge pit in Salt Lake City — is officially on the list, but cleanup there has been completed, so deletion from the list has been recommended.

Additional proposed sites include Midvale tailings and Portland kiln dust site in Salt Lake County, Olson/Niehart Reservoir and Mayflower Mountain tailings in Wasatch County, and radiation-contaminated structures in San Juan County. Three federal facilities — Hill Air Force Base, Tooele Army Depot and Ogden Defense Depot — were also proposed for the list.

The non-federal Utah sites are being addressed by the state health department under a cooperative agreement with the EPA. Alkema said the state will likely negotiate for responsibility to manage work at the Silver Creek site as well.

## Park City asks EPA to remove development from Superfund list

PARK CITY (AP) — City officials are asking the Environmental Protection Agency to take the Prospector Square development off the federal Superfund list of environmental hazards.

Arguing that a stigma has been cast upon the city, the City Council made the request during a meeting with state and federal health officials.

Tailings from lead mills have been found at Prospector Square and its residential neighborhood, Prospector Park. The area was built on a former mine tailings pond site dating back to the late 1800s. Health officials have been concerned about potential hazards posed by the tailings.

What was billed as an informational question and answer meeting with EPA and Utah Department of Health officials became a well-orchestrated grilling by a frustrated and angry City Council and its staff.

Park City Councilman Al Horrigan dubbed the Superfund program a "witch hunt" aimed at acquiring federal funds for the State Health Department at the expense of the community's reputation.

State Rep. Glen Brown, R-Coalville, whose district includes Park City,

questioned the professionalism of the health department, asserting that only one water sample was taken before the area was added to the national priorities list.

That single testing was done during late December when Silver Creek waters were frozen, charged Ron Ivie, Park City's chief building official. Ivie said more than 100 tests of water from 13 wells in the area showed no pollution from tailings.

"We haven't seen any migration of metals to the water," he said.

Ken Alkema, director of the state's Division of Environmental Health, denied Horrigan's allegation that his department wanted the listing for budgetary reasons.

Alkema said the water test only determined that more study of water is required in Prospector Square. The department has gathered other data, including dust from Prospector Park homes. He said that indicated the potential for a health hazard from wind-blown tailings.

Following a debate on the water testing, Alkema said the health department will retest Silver Creek for possible pollution.

"We will work within a 60-day period to determine if Prospector Square should not be on the list," Alkema said.

Prospector Square is on the EPA's updated Superfund list, but no decision will be made for 60 days, until public comment can be solicited, about whether to keep it on the official list.

If the area is approved, the State Health Department is expected to receive a grant of about \$300,000 to study whether groundwater is being polluted from the mill tailings.

The Prospector area first came to attention of health officials in late 1983 when a soil study by the Utah Geological and Mineral Survey showed high levels of arsenic, cadmium and lead there.

A subsequent screening of area children showed that four of them had elevated lead levels in their blood. While the State Health Department said the tailings posed no imminent health hazard, Alkema said his department conducted those blood tests to see if an immediate health risk existed, not as a determination for Superfund ranking.

"We felt there may have been some children at risk."

## Nielson to fight EPA on Superfund, urges Parkites to battle listing locally

Congressman Howard Nielson told a group of Prospector Square residents Saturday he will try to get the Park City development off the federal Superfund list.

Nielson, in a town meeting at the Marsac Municipal Building, said while he doesn't know the facts completely in the case, he would be inclined to fight vigorously to get Prospector off the list. The 3rd District congressman sits on the House Energy and Commerce Committee, which oversees money for Superfund.

Two weeks ago, state officials said the Prospector area would be placed on an updated Superfund list, five months after it had been removed by the Reagan Administration. The development, built partially atop old mine tailings, is listed as Silver Creek.

Ken Alkema, state director of environmental health, said earlier that Superfund money would be used to see whether tailings in Prospector are creating health hazards with airborne dust or is leaching into the ground or surface water. Local residents already have formed a special service district to finance



Nielson says he's no fan of the Environmental Protection agency.

landscaping that would cover the tailings.

But on Saturday, residents told Nielson tests have refuted the state's preliminary findings of a health problem.

A state Department of Health survey said four Prospector children had elevated levels of lead in their blood. But residents said those levels were not found in an independent test by Primary Children's Medical Center.

One woman said she was the mother of a child reported to have a high blood-lead level. She said she took her daughter to several specialists.

"Every doctor said there was absolutely nothing there. They said, 'This is the healthiest child we've seen.'" The family discovered she was sleeping in a crib painted with old lead paint. After the crib was taken away, her lead level dropped, the woman said.

Assistant City attorney Craig Smith told Nielson the city has conducted tests on the ground under the tailings that showed lead levels no different than those in other areas of town. A stability test showed the Prospector tailings were not leaching into other soil, he said, and water tests of the Pacific Ridge well, drilled in the Prospector area, showed no problem.

Kathy McKenna of the Prospector

Square Property Owners Association said while these tests have been going on, the Superfund designation has sent the neighborhood's land values down. "It was \$12 a square foot. Now I don't know what it is," she said.

Resident Kristen Rogers said the Utah Health Department was not honest with the homeowners. Parkites held a meeting two weeks ago, before the state announced the new Superfund list. Officials there agreed they would not mention the dust as a hazard, Rogers said, but hours later included it in the information given to the press.

Residents said at the public hearing they were unhappy with both the press coverage of Prospector and with the government investigation. One man said, "They perpetuated the most preposterous federal investigation we've ever seen."

Nielson said he was no fan of the Environmental Protection Agency because it tends to overstep its regulations and authority. As a congressman, he said, he will work on the problem from the funding end, while Parkites should work on the operational end of the investigation.



# The Park Record

Vol. 106, No. 29 • 2 Sections, 46 Pages • Thursday, August 29, 1985

## Prospector regains Superfund status; Loble says listing casts stigma on city

by CHRISTOPHER SMART  
Record staff writer

Prospector Square is back on the federal Superfund list for cleanup of environmental hazards, five months after the Reagan Administration removed it from consideration for those funds.

The congressional Subcommittee on Oversight and Investigations had championed Prospector's return to the National Priorities List following its removal in March by the Office of Management and Budget (OMB).

Local officials have been informed by the Environmental Protection Agency (EPA) that Prospector will appear on the updated National Priorities List for Superfund money.

State and Park City officials disagree, however, on whether the listing is beneficial.

Park City Manager Arlene Loble contends the listing casts a stigma on Prospector Square and Park City as a whole. She further charges the Superfund program is a tremendous waste of taxpayer money.

But Ken Alkema, the state director of Environmental Health, said without the money from Superfund, potential health hazards from mine tailings in the Prospector area could not be studied.

Prospector Square first gained the

attention of health officials in October 1983 when a Utah Geological and Mineral Survey study revealed the tailings contained high concentrations of heavy metals.

The Prospector Square commercial and housing development was built atop an old mill tailings pond site.

If listed, Prospector would join four other Utah sites among the Superfund priorities. Two of those sites, known as Olsen-Niehart and Mayflower, also are mill tailings deposits in this area. Olsen-Niehart is near Hallstone Junction and the Mayflower site is west of Keetley, near the back side of the Deer Valley ski slopes.

Alkema said he has not seen the list but has been assured Prospector Square will be included under the listing of Silver Creek.

Initial funding in the amount of \$300,000 to \$400,000 will allow the study of surface and ground water as well as the potential of airborne dust from tailings as a health hazard, Alkema said. The tailings contain lead, arsenic, cadmium and zinc.

Preliminary evidence, he said, suggests tailings are polluting water here. Further, health officials must examine whether the proposed landscaping of Prospector Square

will eliminate the possibility of the tailings dust hazard, he said.

A special improvement district has been formed to finance landscaping the Prospector area to cover tailings. That action followed a state Department of Health study that revealed four Prospector children had elevated blood lead levels.

While health officials said the tailings pose no imminent health hazard, they endorsed the landscaping plan aimed at eliminating dust.

Loble maintains Park City cannot win in the Superfund process. "There is little hope that Superfund will carry us out of it."

Her contention is a Superfund listing attaches a stigma to a community and then does nothing to remove it. Superfund has no track record for cleaning up tailings sites, she said. Further, she argued the EPA has no method to clean up sites and no standards to determine which ones are dangerous and which ones are not.

"If they do study a site (once it has a Superfund listing), they don't have a clue what to do about (in the event a health hazard is proved)," she said.

However, Alkema said he believes the health department can move swiftly, if funded by the EPA program. He said he believes the

water studies can be completed during the period of one summer.

The Silver Creek listing was removed from the preliminary National Priorities List on March 25, the day before the OMB approved the update. Silver Creek was the only site removed from the list, according to a source close to the U.S. House of Representatives Subcommittee on Oversight and Investigations.

OMB told EPA Prospector Square's environmental cleanup could be funded through the Surface Mining Control Reclamation Act rather than the Superfund.

But according to a recent court ruling, hazardous mining sites should be cleaned up with Superfund money. In April, the U.S. Circuit Court of Appeals in the District of Columbia ruled in the case of Eagle-Fitch Industries, Inc. vs. the EPA that mining sites should be placed on the National Priorities List, making them available for Superfund money.

Prospector Square had qualified under the Hazardous Ranking System Evaluation in order to be named to the National Priorities List. The EPA's preliminary report on Prospector's tailings lists the potential for groundwater pollution as high. The report also noted the airborne hazard from tailings dust.

# The Park Record

Vol. 106, No. 32 • 2 Sections, 36 Pages • Thursday, September 19, 1985

## Officials hope more tests will clear Prospector's name

by CHRISTOPHER SMART  
Record staff writer

State health officials, during a heated public meeting, agreed to further testing of water near Prospector Square during the 60-day period before the Superfund listing of the area becomes official.

Park City officials hope more tests will show Environmental Protection Agency analysts that Prospector should not be listed on the National Priorities List for Superfund money.

The agreement for more testing comes in wake of a meeting between EPA and state health officials and the Park City Council and its staff Sept. 12. A handful of residents also attended the meeting.

Mill tailings containing lead and other metals have been found in Prospector Square and its residential neighborhood, Prospector Park. The area was built upon a former mine tailings pond site dating back to the late 1800s. Health officials have been concerned about potential health hazards posed by the tailings.

What was billed as an informational question-and-answer meeting

with EPA and state health officials became a grilling of state and federal officials by a frustrated and angry Park City Council and its staff.

Park City councilman Al Horrigan dubbed the Superfund program a "witch hunt" aimed at acquiring federal funds for the State Health Department at the expense of the community's reputation.

State Rep. Glen Brown, R-Coalville, whose district includes Park City, questioned the professionalism of the health department, asserting that only one water sample was taken before the area was added to the National Priorities List.

The single test was done during late December when Silver Creek waters were frozen, said Ron Ivie, Park City chief building official. Further, Ivie said more than 100 tests of water from 13 wells in the area showed no pollution from tailings.

"We haven't seen any migration of metals to the water," he said.

Ken Alkema, director of the state's Division of Environmental Health, flatly denied Horrigan's

allegations that his department wanted the listing for budgetary reasons. He said the water test only determined that more groundwater tests are required in Prospector.

If the area, called Silver Creek tailings on the Superfund list, is approved officially as a National Priorities List site, the State Health Department is expected to receive a grant of about \$300,000 to study whether groundwater is being polluted by the mill tailings.

The water sample was collected by Dr. Marvin Maxell. He said in a telephone interview after the meeting that the sample taken above Prospector near the intersection of Iron Horse Drive and Bonanza Drive was high in cadmium content. A water sample gathered just below Prospector showed high levels of cadmium and lead, he said.

Maxell confirmed that Silver Creek was frozen where the sample was taken below Prospector. He said the water was snowmelt that had run off Prospector and onto the frozen creek while the sun was out.

EPA to A11

## Continued from . . .

### EPA from A1

The sample represented leaching from the tailings, he said.

"Our tests weren't meant to be definitive. We wanted to gather enough information to see if there was a problem," Maxell said.

The Prospector area first came to the attention of health officials in late 1983, when a soil study by the Utah Geological and Mineral Survey showed high levels of arsenic, cadmium and lead there.

A subsequent screening of area children showed four with elevated lead levels in their blood. While the state Health Department said the tailings posed no imminent health hazard, Alkema said at the meeting that his department conducted those blood tests to see if an immediate health risk existed—rather than as a determination for Superfund ranking.

"We felt there may have been some children at risk," he said.

His answer came in response to comments from former Prospector resident Dr. Robert Winn, a pediatrician who sits on the Summit County Health Board. Winn asked Alkema if he could explain why subsequent private blood screenings showed that those children had normal blood-lead levels.

Winn said those results were for-

warded to the State Health Department, but Alkema said his department received no information on any subsequent blood tests.

In a telephone interview, Dr. Dennis Perrotta from the Bureau of Epidemiology at the State Health Department said he also is unaware of private blood tests. Perrotta conducted the blood testing in Prospector Square in 1984.

He said in one instance three children in one family were found to have elevated blood-lead levels. His department later isolated high lead counts in the family's home-grown vegetables.

In another case, one child in a second family was found to have elevated blood-lead levels. The health department later isolated lead in the paint on the bed in which the child slept.

Park City Manager Arlene Lobie prepared 13 questions which she and the city council members put to Alkema and William Geise, the chief of the Superfund branch of EPA's Denver Region VIII.

It is Lobie's contention that the Superfund program has a poor track record of cleaning up hardrock mine sites. The prepared questions asked for specifics on EPA standards for Superfund listing as well as implementation of funding a cleanup for proposed sites.

Geise told local officials that Prospector Square is one of 860 sites proposed or currently listed on the National Priorities List. He said the Park City site, which he characterized as "80 acres of tailings, 1 to 10 feet deep," made its way onto the list following a scoring process known as the hazard ranking system.

Prospector scored 38.4 on the ranking. By EPA standards, all sites above 28.5 are eligible for Superfund money. By comparison, a tailings site in Midvale scored in the mid-70s. Criteria for scoring include the nature of chemicals and the probability they may find their way into the human food chain, he said.

Prospector's ranking is the result of the single water sample, although other data was collected, Alkema said at the hearings. That data includes dust from Prospector Park homes, which indicated the potential for a health hazard from wind-blown tailings, he said.

Geise noted that Prospector and other Superfund sites were isolated from an inventory of 16,000 sites that have been evaluated by the EPA across the nation. Data collected from potential environmental hazards must be evaluated for quality control by the Washington D.C.-based Mitre Corp. before the agency accepts it.

Questioned repeatedly by city of-

ficials on exact chemical levels required for listing on Superfund, Geise said exact chemical standards have not been established, but "we (EPA) have developed risk assessment."

Ivie responded to Geise, saying EPA made it impossible for Park City to challenge the listing.

"It's incomprehensible. It's unfair. Why haven't you adopted standards for metals?"

Park City resident and city council candidate Ann MacQuoid told Geise that Park City was spending money to clean up the problem itself. Since the city is acting responsibly, "why not take us off the list and let us clean up our own problem?"

To date, Park City has spent in excess of \$1.3 million in improvements aimed at solving the potential health hazard from the tailings. Improvements include landscaping the area to prevent dust, creek bed modifications aimed at eliminating any remaining metals and the construction of a detention pond to keep any additional metals from finding their way into the stream.

But while Geise found the work commendable, he said it may not be a factor in the final decision on Prospector.

"Once you get tangled up with the Superfund law, you must play by the Superfund rules," he said.

Hazardous waste site listed under the  
Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA "Superfund")

SILVER CREEK TAILINGS  
Park City, Utah

The Silver Creek Tailings Site covers approximately 80 acres in Park City in Summit County, Utah. From 1900 to 1930, various mining companies operated on the site and disposed of approximately 700,000 tons of mine tailings. In the early 1940s, Pacific Bridge reworked the tailings in place with acids and solvents to reclaim silver. In the late 1970s and early 1980s, 30 single-family homes and 50 apartments were built on the tailings. The tailings were not covered and are still exposed in undeveloped areas.

According to tests conducted by the Utah Department of Health, surface water and air are contaminated with lead, cadmium, and silver. The potential for ground water to be similarly contaminated is high. About 10,000 people (including the winter population) live within 3 miles of the site.

Facility name: Silver Creek Tailings

Location: Park City, Summit County, Utah

EPA Region: VIII

Person(s) in charge of the facility: Park City Municipal Corporation

Name of Reviewer: Eric Johnson Date: 1/15/85

General description of the facility:  
(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

The Prospector Square area of Park City is constructed upon  
abandoned mine tailings. The mine tailings contain elevated  
levels of heavy metals. Tailings are exposed on the ground and  
are a potential source of contamination to the ground and  
surface water regimes of the area as well as to the air.

Scores:  $S_M = 38.40$   $(S_{gw} = 61.36$   $S_{sw} = 25.45$   $S_a = 0)$   
 $S_{FE} =$   
 $S_{DC} =$

## FIGURE 1 HRS COVER SHEET

QA -  
R. L. Hanning, Jr.  
7 Feb 88

Ground Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
<b>[1] Observed Release</b>	(0) 45	1	0	45	3.1	
If observed release is given a score of 45, proceed to line <b>[4]</b> . If observed release is given a score of 0, proceed to line <b>[2]</b> .						
<b>[2] Route Characteristics</b>					3.2	
Depth to Aquifer of Concern	0 1 2 (3)	2	6	6		
Net Precipitation	(0) 1 2 3	1	0	3		
Permeability of the Unsaturated Zone	0 1 (2) 3	1	2	3		
Physical State	0 1 2 (3)	1	3	3		
Total Route Characteristics Score			11	15		
<b>[3] Containment</b>	0 1 2 (3)	1	3	3	3.3	
<b>[4] Waste Characteristics</b>					3.4	
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8		
Total Waste Characteristics Score			26	26		
<b>[5] Targets</b>					3.5	
Ground Water Use	0 1 2 (3)	3	9	9		
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 (32) 35 40	1	32	40		
Total Targets Score			41	49		
<b>[6]</b> If line <b>[1]</b> is 45, multiply <b>[1]</b> x <b>[4]</b> x <b>[5]</b> If line <b>[1]</b> is 0, multiply <b>[2]</b> x <b>[3]</b> x <b>[4]</b> x <b>[5]</b>			35178	57,330		
<b>[7]</b> Divide line <b>[6]</b> by 57,330 and multiply by 100			$S_{gw} = 61.36$			

**FIGURE 2**  
**GROUND WATER ROUTE WORK SHEET**

*Handwritten signature*  
2/7/85

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
<b>1</b> Observed Release	0 <b>(45)</b>	1	45	45	4.1	
If observed release is given a value of 45, proceed to line <b>4</b> . If observed release is given a value of 0, proceed to line <b>2</b> .						
<b>2</b> Route Characteristics					4.2	
Facility Slope and Intervening Terrain	0 1 2 3	1		3		
1-yr. 24-hr. Rainfall	0 1 2 3	1		3		
Distance to Nearest Surface Water	0 1 2 3	2		6		
Physical State	0 1 2 3	1		3		
Total Route Characteristics Score				15		
<b>3</b> Containment	0 1 2 3	1		3	4.3	
<b>4</b> Waste Characteristics					4.4	
Toxicity/Persistence	0 3 6 9 12 15 <b>(18)</b>	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 <b>(8)</b> 7	1	8	8		
Total Waste Characteristics Score			26	26		
<b>5</b> Targets					4.5	
Surface Water Use	0 1 <b>(2)</b> 3	3	6	9		
Distance to a Sensitive Environment	<b>(0)</b> 1 2 3	2	0	6		
Population Served/Distance to Water Intake Downstream	0 4 6 <b>(8)</b> 10 12 16 18 20 24 30 32 35 40	1	8	40		
Total Targets Score			14	55		
<b>6</b> If line <b>1</b> is 45, multiply <b>1</b> x <b>4</b> x <b>5</b>			16380			
If line <b>1</b> is 0, multiply <b>2</b> x <b>3</b> x <b>4</b> x <b>5</b>				64,350		
<b>7</b> Divide line <b>6</b> by 64,350 and multiply by 100			$S_{sw} = 25.45$			

**FIGURE 7  
SURFACE WATER ROUTE WORK SHEET**

*Rig*  
2/5/55

Air Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
<b>1</b> Observed Release	0                      45	1	0	45	5.1	
Date and Location:						
Sampling Protocol:						
If line <b>1</b> is 0, the $S_a = 0$ . Enter on line <b>5</b> . If line <b>1</b> is 45, then proceed to line <b>2</b> .						
<b>2</b> Waste Characteristics					5.2	
Reactivity and Incompatibility	0 1 2 3	1		3		
Toxicity	0 1 2 3	3		9		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8		
Total Waste Characteristics Score				20		
<b>3</b> Targets					5.3	
Population Within 4-Mile Radius	} 0 9 12 15 18 21 24 27 30	1		30		
Distance to Sensitive Environment	0 1 2 3	2		6		
Land Use	0 1 2 3	1		3		
Total Targets Score				39		
<b>4</b> Multiply <b>1</b> x <b>2</b> x <b>3</b>				35,100		
<b>5</b> Divide line <b>4</b> by 35,100 and multiply by 100			$S_a = 0$			

**FIGURE 9**  
**AIR ROUTE WORK SHEET**

*PCF*  
*2/10/85*

	S	S <sup>2</sup>
Groundwater Route Score (S <sub>gw</sub> )	61.36	3765.05
Surface Water Route Score (S <sub>sw</sub> )	25.45	647.70
Air Route Score (S <sub>a</sub> )	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		4412.75
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		66.43
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		38.40

FIGURE 10  
WORKSHEET FOR COMPUTING S<sub>M</sub>

*RCJ*  
*2/19/85*

DOCUMENTATION RECORDS  
FOR  
HAZARD RANKING SYSTEM

INSTRUCTIONS: As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference. Include the location of the document.

FACILITY NAME: Silver Creek Tailings

LOCATION: Park City, Summit Co., Utah

DATE SCORED: 2/7/85

PERSON SCORING: Eric Johnson/R. Channing Johnson

PRIMARY SOURCE(S) OF INFORMATION (e.g., EPA region, state, FIT, etc.):

See References

FACTORS NOT SCORED DUE TO INSUFFICIENT INFORMATION:

None

COMMENTS OR QUALIFICATIONS:

GA  
R. Johnson  
2/7/85

## GROUND WATER ROUTE

### 1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Rationale for attributing the contaminants to the facility:

\* \* \*

### 2 ROUTE CHARACTERISTICS

#### Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

The aquifers in the vicinity of the site (Ref. 2) function as a single hydrological unit for HRS purposes as demonstrated by the Park Meadow Well test (Ref. 12). USGS topo maps for locations (Ref. 13).

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Less than 10'; Ref. 2, page 1

Depth from the ground surface to the lowest point of waste disposal/storage:

11'; Ref. 4, borehole #5

HRS value = 3

Ref  
2/7/85

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

~20" per year

Ref. 5

Mean annual lake or seasonal evaporation (list months for seasonal):

~32" per year

Ref. 6

Net precipitation (subtract the above figures):

-12" approximately

HRS Value = 0

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Thin gravels to thick fine-grained alluvial soil on the valley bottoms.

Ref. 3, page 8

Permeability associated with soil type:

$10^{-2}$  cm/sec to  $10^{-5}$  cm/sec

Ref. 3, page 8

HRS Value = 2

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Ref. 7 (cover letter) states that it is believed that some of the tailings were water-slurried to the site. This was common practice.

HRS Value = 3

\*\*\*

*Ref*  
2/7/85

### 3 CONTAINMENT

#### Containment

Method(s) of waste or leachate containment evaluated:

The tailings were deposited without containment on top of the natural soils.

Ref. 4, boreholes

Method with highest score:

Piles uncovered, waste unstabilized, no liner.

HRS Value = 3

### 4 WASTE CHARACTERISTICS

#### Toxicity and Persistence

Compound(s) evaluated:

Arsenic

Cadmium

Lead

Samples of tailings in Ref. 7

Compound with highest score:

Lead

HRS Value = 18

#### Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

645,333 yd<sup>3</sup>

Basis of estimating and/or computing waste quantity:

80 acres times 5' average depth (depth ranges from 1 to 10')

Ref. 7, cover letter

HRS Value = 8

\* \* \*

*RCJ*  
*2/3/85*

## 5 TARGETS

### Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Private wells east of the site on route 40 have no alternative supply. Also Theriot Springs and Spiro Tunnel of Park City supply are slightly over 1 mile from the site.

Ref. 14, Ref. 9

HRS Value = 3

### Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

East of site along route 40

Ref. 14

Distance to above well or building:

3/4 mile

Ref. 14

HRS Value = 3

### Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Theriot Spring and Spiro Tunnel of Park City system with 2400 metered connections plus businesses.  $*3.8 \text{ persons/connection} = 9120$

2 private wells on route 40:  $5*3.8 = 19$

Ref. 14,15

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

None identified

Total population served by ground water within a 3-mile radius:

9139

This is a minimum estimate of the winter population which may include over 10,000 tourists plus permanent population.

Ref. 15

HRS Value = 4      HRS Matrix = 32

*Ref*  
2/7/85

## SURFACE WATER ROUTE

### 1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

Lead; Ref. 10 - attached data sheet

Note that As, Cd, Cr, Cu and Zn were also somewhat elevated in the downstream sample versus the upstream background

Rationale for attributing the contaminants to the facility:

Pb at 112 ppb in melt flowing from tailings pile into Silver Creek vs. 5 ppb just upstream in Silver Creek. Ref. 10, Ref. 14. These contaminants are found in the tailings (Ref. 7)

HRS Value = 45

\* \* \*

### 2 ROUTE CHARACTERISTICS

#### Facility Slope and Intervening Terrain

Average slope of facility in percent:

Name/description of nearest downslope surface water:

Average slope of terrain between facility and above-cited surface water body in percent:

Is the facility located either totally or partially in surface water?

Is the facility completely surrounded by areas of higher elevation?

1-Year 24-Hour Rainfall in Inches

Distance to Nearest Downslope Surface Water

Physical State of Waste

\* \* \*

### 3 CONTAINMENT

#### Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

*R. J.*  
*2/17/85*

#### 4 WASTE CHARACTERISTICS

##### Toxicity and Persistence

###### Compound(s) evaluated

Lead  
Arsenic  
Cadmium

} See ground water route

HRS Value = 18  
Compound with highest score:

Lead

##### Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

645,333 yd<sup>3</sup>

Basis of estimating and/or computing waste quantity:

See ground water route

HRS Value = 8

\*\*\*

#### 5 TARGETS

##### Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Irrigation of hay and pasture grass

Ref. 11

HRS Value = 2

*R.D.*  
*2/3/85*

Is there tidal influence?

No

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

None identified

Ref. 13

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None identified

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

Between  $2\frac{1}{2}$  and  $2\frac{3}{4}$  miles downstream from the site

Ref. 16

Computation of land area irrigated by above-cited intake(s) and  
conversion to population (1.5 people per acre):

500 acres or more

Ref. 11, -Ref. 16

Total population served:

$500 * 1.5 = 750$

Name/description of nearest of above water bodies:

Silver Creek

Distance to above-cited intakes, measured in stream miles.

This acreage lies within 3 stream-miles from the site

HRS Value = 8

REC  
2/19/85

## AIR ROUTE

### 1 OBSERVED RELEASE

#### Contaminants detected:

Although dust samples in houses have shown contamination, the procedures used do not establish for HRS purposes that the contaminants migrated specifically by the air route.

HRS Value = 0

Date and location of detection of contaminants

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

\*\*\*

### 2 WASTE CHARACTERISTICS

#### Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

\* \* \*

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi

0 to 1 mi

0 to 1/2 mi

0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

*RLA*  
*2/2/85*

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

*Red  
8/1/83*

## REFERENCES

If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found.

Reference Number	Description of the Reference
1)	Uncontrolled Hazardous Waste Site Ranking System: A Users Manual. 47 FR 31219-31243, 16 July 1982 (Appendix A, CERCLA)
2)	Water Resources of the Heber-Kamas-Park City Area, North-central Utah. Tech. Pub. #27, State of Utah, Dept. of Nat. Resources, 1970.
3)	Engineering Geology of Park City, Summit County, Utah. Utah Geological and Mineral Survey, Utah Dept. of Nat. Resources; Special Studies 66, June 1984.
4)	Boring Logs, Prospector Square Area, Park City, Utah. Utah Geological and Mineral Survey, December 1983.
5)	Mean Annual Precipitation, Climatic Atlas of the U.S., U.S. Dept. of Commerce, June 1968.
6)	Climatic Atlas of the United States, U.S. Dept. of Commerce.
7)	State of Utah, Dept. of Health, Div. of Env. Health Site Inspection Report for Prospector Square, Park City, Utah, 8/30/84.
8)	Sax, N.I., 1979; Dangerous Properties of Industrial Materials, 5th Ed. Van Nostrand and Reinhold Co., NY
9)	Park City Water Resources Study, Nov. 1982, J.J. Johnson and Assoc., Park City, Utah.
10)	Preliminary Assessment, State of Utah, Dept. of Health, Div. of Env. Health, January 1983.
11)	Personal communication, Marc Gesink to Fred Duberow, J.J. Johnson and Assoc. 4/23/84 (801) 649-9811
12)	Phone call: R. Channing Johnson, MITRE Corp. to Walt Holmes, USGS, Salt Lake City. 2/7/85
13)	USGS 7½' maps: Park City East, Utah (1955) and Park City West, Utah (photorevised, 1975).
14)	Phone call: R. Channing Johnson, MITRE Corp. to Marv Maxell, Utah Dept. of Health. 2/6/85.
15)	Phone call: R. Channing Johnson, MITRE Corp. to Gerry Gibbs, Director, Dept. of Public Works, Park City, Utah. 2/5/85.
16)	Phone call: Eric Johnson, USEPA to Mark Oliver, J.J. Johnson Assoc. 2/7/85.

*RCJ*  
*2/1/85*



Office of City Manager

September 5, 1985

Eric W. Johnson  
Environmental Scientist  
Environmental Protection Agency  
Region VIII  
One Denver Place  
999 18th Street  
Denver, Colorado 80202

Dear Eric:

In order to respond within the 60 day review and comment period with adequate facts, I would appreciate your response to the following specific questions with respect to EPA's position on adding the Silver Creek site to the Super Fund List and as to the status of other projects already included or proposed to be included on the Super Fund List:

1. A complete listing of all Super Fund sites that are still in the "proposed for inclusion" stage or officially on the Super Fund List as of the date of the beginning of the review and comment period. I understand that will be as soon as the Federal Register describing our inclusion has been published. When will this list be made available to us, and when will the Federal Register be published?
2. Together with the list of proposed and actual Super Fund sites, will you please include the date when they were added either to the Super Fund proposed or official list and what ranking these projects have within the Super Fund overall list. From OMB I learned that projects are ranked in groups of 50, according to the severity of the ranking. Can you tell us where the Silver Creek site ranks on both the proposed list and the actual approved Super Fund List? When will this information be made available to us? How many sites are on the Super Fund List? I heard estimates of 500 to more than 1,000.
3. Will you explain the status of funding on all Super Fund proposed and actually approved projects? Have they been funded for (a) an initial work plan, (b) remediation study, (c) implementation plan following remedial study, and (d) actual implementation of the corrective work determined by the remediation study and

the implementation work planned. How much money has been devoted to each of the stages on a project by project basis, and where there are projects on the List that have not been funded, an explanation as to why they have not been funded.

4. It is my understanding from OMB in Washington that the primary reason they objected to adding any more mine tailing sites to the Super Fund List is that no mining site has yet had developed a feasible corrective action plan, and they questioned adding more mine tailing sites until such time as the Super Fund had successfully developed financially feasible options for cleaning up mine tailing sites. Is this information accurate or inaccurate?
5. In our meeting two weeks ago, you said that information from other mine tailing sites was not really pertinent because you had to study each site on a site specific basis. Although I realize that you will want to draw data independently from the Silver Creed site, I still do not understand why you were not aware or nor did I sense you felt that it was important to be familiar with what had been done on mine tailing sites in other locations. If I misinterpret your comments, will you please clarify, but in any event identify for us the status of study, remedial investigation, work plan and implementation for all mine tailing sites now being considered for the Super Fund. Copies of the results of any of these studies would be most helpful. You will recall that you didn't suggest any examples of sites when I asked you about this when we met and we would appreciate your looking into this issue further.
6. In our meeting two weeks ago, you said that the only issues you were interested in with respect to our eligibility for Super Fund was the surface and ground water, and that the airborne dust was not a problem from the Super Fund's perspective and that the methodology used in the blood tests by the Health Department on children in the area, in any event, would not be acceptable data to you. Will you please clarify if I am in error in interpreting your remarks because the State Health Department is still insisting that this is of importance to the EPA as well as to the State Health Department.
7. Again in our discussion two weeks ago, you mentioned that you were only interested in ground and surface water, you indicated at that time that the EPA had done independent tests. Ken Alkema of the State Health Department doesn't know of any such tests -- none of it has been included in the file we have gathered under the Freedom of Information Act. Would you clarify

specifically what studies the EPA has done independently of those that we have jointly done with the Health Department which showed both surface and ground water above and below Prospector to be safe for drinking water purposes.

8. Have you give any reconsideration of the scoring that was done on Prospector for "Silver Creek" more than a year ago. We ask because since that time of course we have done the special improvement district, which includes a state grant for improvements to the Silver Creek drainage channel and a detention pond in Prospector Park which will largely in the opinion of the State Flood Control Board and the Department of Natural Resources, solve the problem of tailings discharged into the creek. If you have not considered this data, will you be willing to rescore our nomination in light of these additional facts?
9. According to the State Health Department, EPA is anticipating putting \$300,000 to \$400,000 into just the study phase on this particular site. To my knowledge no background investigation has been done to identify why or if the Prospector area is any different than the properties located above and below the Prospector area. On our own Park City Municipal Corporation has utilized the services of consulting engineers and an independent testing lab to test the soil conditions in other parts of Park City. We have found instances where the natural soils not tailings, have higher mineral contents than the Prospector area. Again, I will repeat the question that I asked two weeks ago -- what criteria is used to determine that a site is a site and for what reason have you selected Prospector as a site. Has this been based on EPA's independent testing, or on information received from other data? If so, please identify the data used to score Prospector.
10. Ken Alkema, the Director of the State Health Department, agrees with the position taken by Park City that funding in the \$300,000 to \$400,000 range just for the study phase is impractical and not cost effective when a more thorough preliminary investigation by EPA could save a lot of the taxpayers money and at the same time, reduce your Super Fund List to a manageable size. Why are you unwilling to fund the type of studies that Park City Municipal Corporation has undertaken on its own that has proved to our satisfaction that the kind of problems you are looking for probably do not exist in Prospector, and yet you leave no alternative but to go through the study phase to confirm or reject our findings. To date you have shown no interest in even considering our data in a preliminary way.

11. As you know, this is not the first time that Prospector has been considered for inclusion on the Super Fund List. We were on the proposed list last October and removed by the President's Office of Management and Budget. It is my understanding that the proposed sites from last October still have not been cleared by EPA for inclusion on the final list or for any funding. You require that we prepare all of our comments and submit them to you within a 60 day period. But apparently you have no limitation and can delay indefinitely leaving some 250 sites in a state of limbo, neither funded nor cleared by the Super Fund status. Is that accurate information and do you view that as a responsible way to deal with potential sites that are essentially left in limbo?
12. Last, but probably most important, we need an answer to our most often asked question to which we feel we have never received an adequate reply. Why is it impossible to set some standard or range within which you are willing to commit as being indicative of a true or even a potential health hazard. If we can't have even this basic information, how can we know what you are looking for or what would tell a prudent person that they are likely to suffer from adverse health impacts. Your current practice of not providing this information we believe to be the basic cause of our distrust of the whole Super Fund Program.

I recognize that some of these questions may take more time for you to research, but will you please respond immediately at least indicating when you believe you will be able to answer each of the questions outlined above, and indicate whether or not your answer will be in time for us to consider your responses as a part of our comments to be submitted to EPA.

Sincerely,

Arlene Loble  
City Manager

cc: Howard Nielson  
United States House of Representatives

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION III

ONE DENVER PLACE -- 800 1ST STREET -- SUITE 1800

DENVER, COLORADO 80002-2413

OCT 16 1985

Ref: 8HWM-SR

Arlene Loble  
City Manager  
Park City Municipal Corporation  
P. O. Box 1480  
Park City, UT 84060

Dear Ms. Loble:

I am writing in response to your letter to Eric Johnson dated September 5, 1985. I apologize for the delay in answering your letter. Many of the questions you raised were very complex, and it has taken some extra time to prepare a reply. I believe that this letter, and the enclosed material, will help you understand the Superfund process, EPA's position on the Silver Creek Tailings site and the status of other mine waste sites.

Many of your questions as well as our responses are general in nature and hence may not all contribute to specific comments you wish to make on the proposed NPL nomination of the Silver Creek Site. Nonetheless, I hope the information provided is useful and responsive to your letter.

Our responses, in the same order as the questions in your letter, follow:

1. I have enclosed the lists of all the NPL sites that have been proposed or finalized to date. The bound document titled "National Priorities List" and dated October 1984 has an excellent introductory section explaining the entire NPL process. I believe this will answer many of your questions concerning dates of inclusion on the NPL, etc., as well as define the terminology that is used on NPL updates. The other two documents list the sites that have been proposed for NPL Updates #3 and #4. The Federal Register containing the Update #4 sites (including Silver Creek) was published on September 18, 1985. A copy is also enclosed for your information.
2. The Silver Creek site currently falls into Group 7 (out of 10) on the proposed NPL Update #4. The final groups that each site in Update #4 will fall into will not be determined until the list is promulgated, after the public comment period. The total number of proposed and finalized sites on the NPL is currently 850 nationwide.

3. Your question regarding the status of funding for all Superfund sites is very difficult to answer, since there are 850 sites on, or proposed for, the NPL. In general terms, once a site is included on the NPL, either as proposed or finalized, the site becomes eligible for funding under Superfund. I have enclosed a flow diagram which illustrates the Superfund process for the NPL sites. The Silver Creek site is at the "Assign National Priorities List" stage on the diagram. The site will be eligible for funding as long as it is on the NPL, either as proposed or finalized, and we will move forward toward investigating the site and implementing a final solution.
4. It is our understanding that OMB's objection to listing mining sites on the NPL is based on their belief that these sites may be covered by other Federal programs. Specifically, OMB argued that the Surface Mining Control and Reclamation Act (SMCRA), and not Superfund, should be used at old mining sites. EPA does not believe that SMCRA has adequate authority or funding in every instance to address these sites. Where SMCRA cannot be expected to provide a clean up mechanism, EPA intends to apply CERCLA authorities at such sites.

As Mr. Johnson indicated in his August 28, 1985 letter to Mr. Ivie, many NPL mining sites are very large. The California Gulch site in Colorado, for instance, includes 40 square miles. Due to the size and complexity of such projects, we do not have completed Remedial Investigation/Feasibility Study reports to provide to you at this time. We do have a finalized site investigation document for the Whitewood Creek site in South Dakota, and that is being sent under separate cover.

5. Mr. Johnson's remarks at the August 22, 1985 meeting concerning other mining sites should not have been interpreted as you state in your letter. As EPA investigates these other sites, we are able to develop a better understanding of the general public health and environmental problems associated with mining wastes. Any clean up remedies, however, must always be based on site-specific information and investigation.

Most mining sites in Region VIII, on or proposed for the NPL, are in the remedial investigation phase of the clean up process except for: a) the Mayflower site in Utah which has not yet received funding, b) the Portland Cement site in Utah at which State-responsible party negotiations are underway, and c) Eagle Mine, (Colorado) where State action is underway to recover natural resource damages under CERCA.

6. Concerning the airborne dust issue and the blood test results, Mr. Johnson said that the air "route" for the Hazard Ranking System (HRS) had not been scored, and that the HRS score was based on the surface water and ground water routes. He also noted that the blood test results had not been used in the HRS. The fact that the air route was not used in the HRS score does not in itself imply that there are no environmental concerns in this area.
7. EPA has not conducted any independent sampling at the Silver Creek Tailings site. The analytical results used for the HRS scoring were provided by the Utah Health Department.
8. It is EPA's national policy to score sites as they are initially discovered. This policy was developed to ensure comprehensive clean up actions at waste sites. EPA is concerned that partial clean-ups, aimed only at lowering an HRS score, would not adequately address all the problems at hazardous waste sites. It would therefore be inconsistent with our national policy as well as our standard HRS procedures to rescore this site based on samples taken after some mitigation work has been completed.
9. The Prospector area was identified for HRS purposes on the basis of upgradient and downgradient stream samples in Silver Creek. As Mr. Johnson explained in the August meeting, there are no concentration criteria for designating Superfund sites. EPA looks for a downgradient sample that shows significantly higher concentrations of hazardous material than in an upgradient sample. In Silver Creek, the upgradient sample showed 5 ppm lead, while the downgradient sample had 112 ppm lead. Where such distinctions exist between upgradient and downgradient samples, a release of contamination is determined to have occurred. EPA then considers the release in the context of waste type and target population, with all three factors contributing to a final HRS score.

You also asked if there were other "clearly identifiable" sites in Utah that were more toxic than Prospector. EPA and the Utah Health Department have already proposed four sites in Utah for the NPL, and we are evaluating several others. It is still too early to say whether these other Utah sites pose a greater health hazard than the Silver Creek site.

In practice EPA makes no comparisons among sites. Individual sites are simply too unique to attempt comparisons based on health hazards. Once sites are placed on the NPL, no further screening for relative hazard characteristics occurs unless immediate site risks require removal action or other emergency response. EPA and the State will continue to examine potential Superfund candidates in Utah, using the same evaluation procedures that were used for the currently proposed sites.

10. It is difficult at this time to estimate what the cost of a Remedial Investigation and Feasibility Study at the Silver Creek Tailings site might be. The important point for EPA, however, is that a site must be on or proposed for the NPL before any funding can be authorized for a comprehensive site investigation. Based on this program requirement, we have scheduled our own work at the site to begin once CERCLA reauthorization occurs and FY 86 funds are made available to EPA.

I must respectfully disagree with your statement that EPA has shown no interest in the site information you have. To my knowledge, we have never received any data or other information from you with respect to this site. I encourage you to include any such information with your comments on the nomination of the Silver Creek Tailings site to the NPL, so EPA can evaluate and respond to that material.

11. It is true that the sites proposed for the NPL in October, 1984 have not yet been formally included on the NPL. This is due in part to EPA's open policy of accepting comments on these proposed sites well after the 60 day comment period has ended. Some 12,000 pages of comments were received by EPA on this update, requiring time to review and respond to each. I encourage you to submit any comments you may have on the Silver Creek Tailings site by the end of the official comment period, November 17, 1985.

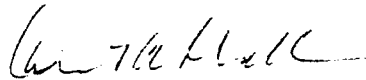
EPA can and does start work at sites before they are finalized on the NPL. At the Midvale Tailings site for instance, which was proposed for the NPL in October, 1984, the State of Utah and EPA have developed a preliminary work plan and have selected a contractor to do a RI/FS.

12. A list of potentially responsible parties has not yet been developed for the Silver Creek Tailings site. It is also important to note that the courts, not EPA, ultimately determine which parties are "responsible" for cost recovery purposes under CERCLA. As a general rule, EPA considers all current and former operators, owners and waste generators associated with a site to be potentially responsible parties.

13. The Silver Creek site has been handled according to standard EPA procedures for evaluating and proposing Superfund sites. As discussed above, in #9, there are no waste concentration standards for potential Superfund sites. Since EPA's goal is to identify potential sites before the problems become critical, the Agency evaluates upgradient and downgradient samples for signs of significant increases in the levels of contaminants. Since each site we address is unique, the use of set standards or criteria would not be consistent with our objectives in such an evaluation.

Included with this letter are a List of Enclosures and documents concerning the Superfund program, the NPL and the Silver Creek Tailings site.

Sincerely,



David A. Schaller, Chief  
Superfund Program Section

Enclosures

cc: Loretta Pickerell, UDH



Office of City Manager

October 22, 1985

William Geise  
Environmental Protection Agency  
One Denver Place  
999 18th Street  
Denver, Colorado 80202

RECEIVED  
OCT 24 1985

Superfund  
Remediation Branch

Dear Bill:

I am responding to David Schaller's letter to me of October 16th, in response to my letter to Eric Johnson of September 5, 1985. The correspondence is disappointing because it deals in such generalities that it is not helpful in responding within the 60 day comment period. I need your assistance in receiving a complete and timely response to this letter which restates the questions.

My comments are in the same order as the questions asked in my original letter and Schaller's responses, dated October 16, 1985:

1. The answer is complete, and confirms the information already available in the September 18, 1985 Federal Register.
2. The answer is complete, and confirms the information already available in the September 18, 1985 Federal Register.
3. The answer "general terms" is not responsive to the question. I'm trying to find out how much money has been spent by the Superfund or by responsible parties on the Superfund proposed or approved sites. How much money has been spent and at what stage is each site in the study and clean-up process. I've requested this information for all Superfund sites, but am specifically concerned about mining sites.
4. The response clarifies the issue with respect to OMB's position on jurisdiction. If I understand the response correctly, both SMACKRA and EPA Superfund have jurisdiction over mining sites.

The heart of the question is has EPA developed financially feasible plans for clean-up on any mining sites? The response suggested additional information would be forthcoming with respect to a site in South

Dakota, but did not indicate that any other information would be forthcoming.

5. Again, the answer is incomplete. If information on mining sites is in fact utilized in the study of other mining sites, I want to know what information is available so that we can use it for a comparison basis.

The response does identify particular sites that are not progressing with clean-up, but I still don't even have a list of mining sites that exist in Region VIII or their status with respect to either investigation or clean-up.

6. The response is adequate.
7. At my meeting with Mr. Johnson, he did say that the EPA had done independent studies and this response clarifies for the record that all information has been provided by the State Health Department and that the EPA did no independent testing for the HRS scoring. When you were here in Park City, you said that there had been discussions among the State Health Department, MITER Corporation and EPA. Any written correspondence or clarification as to those discussion would be very helpful.
8. The response clarifies EPA's position with respect to clean-up activities, i.e., none done on a local basis, are valid for consideration in re-assessing the HRS score. There is no mitigation work, however, that has been completed or even begun in Prospector that deals with the surface or ground water issue. Will EPA re-score not on the basis of local clean-up activity, but on the basis of information available at the time of the scoring and on the basis of more recent information gathered in conjunction with the State Health Department that refutes the validity of the one and only test used with respect to surface water.
9. I understand the response, but it is unresponsive to the real issue which is how did the EPA determine that the Silver Creek site different from the "background", when no background testing was ever conducted.

The second part of the response was that there are other sites in Utah and elsewhere that may well be more toxic than Prospector, but no information was provided with respect to either their listing or scoring.

10. I must "respectfully disagree" with Mr. Schaller's response to my question concerning the submission of new data to the EPA. When I talk with Mr. Johnson, I told him that additional data was available and he said

it would not be considered because the total scoring will be based on data already submitted by the State Health Department, not on additional data gathered by Park City.

11. EPA's position on official comments submitted to EPA is clarified. The 250 some sites listed last October that have not been responded to by EPA are "due in part to EPA's open policy on accepting comments well after the 60 day comment period". A more complete response would be appreciated.

Your response to the question about studying sites before they are on the official list confirms my understanding that this certainly blurs the distinction between being on the proposed list or on the actual Superfund List. What is the distinction in terms of how they are treated? If a site can be studied, and if the owners of a site can be sued, and if a work plan can be instigated before any response to the review and comment period, what is the purpose of the review and comment stage?

12. This is a complete answer to my question with respect to whether or not responsible parties have been identified. According to the response, they have not. As soon as you have any information available with respect to your search for a responsible party, will you please make it available to us. Naturally, Park City is very concerned that current owners could be held as responsible parties. According to the September 18, 1985 Federal Register, EPA is required to certify that impacts on the small government will be minimal. Has this been done?
13. The response to this question is complete in that it clarifies EPA's position that each site is considered on an individual basis, and in that way each site is considered unique. As a consequence, no standards are set for objective criteria developed to determine whether a "real" or potential hazard exists. Apparently those are the rules, but they are unfair.

Anything that you can do to help, will be greatly appreciated.

Sincerely,



Arlene Loble  
City Manager



①

Office of City Manager

October 22, 1985

William Geise  
Environmental Protection Agency  
One Denver Place  
999 18th Street  
Denver, Colorado 80202

Dear Bill:

I was disappointed in the response I received from David Schaller, Chief of the Superfund Program Section, to my September 5, 1985 letter requesting information to help Park City prepare our official comments (within the 60 day limit) required under EPA rules.

I discussed this problem with Ken Lloyd, our State liaison in Denver, and he was most cooperative in offering his personal assistance in obtaining the mining site data requested; which he thought would be readily available. I'm certain part of the problem comes from having too many people involved, and I'd like to suggest that in the future, all correspondence be handled directly between you and I; with copies to whomever else needs to be informed. In that way, we can be certain that through one on one communication, neither Park City's requests nor EPA's responses will be incomplete because of any misunderstandings.

I'm going to follow-up in a separate letter with specific responses to Mr. Schaller's October 16th letter to me, but I think that I can save a lot of time by summarizing my specific requests. I want all of the information that is available on mining sites that have been included on either the proposed or the final Superfund List. I want to know:

1. How many mining sites are there on the proposed and final List?
2. What are the sites?
3. Where are they located?
4. When were they placed on the List, and what are the HRS scorings?
5. What is the status of each site?

Page 2  
William Geise  
October 22, 1985

6. What data is available to compare sites? <sup>DB</sup>
7. At which stage are the sites in the study and clean-up process?
8. Do any mining sites have approved plans for remedial action?
9. Have any mining sites actually been cleaned up?
10. How much money has been spent on each site with Superfund monies?
11. How much money has been spent on sites that has been recovered or will be recovered from responsible parties?
12. Are there any sites that have been cleaned up or studied with Superfund monies where a responsible party has not been identified?

Sincerely,



Arlene Loble  
City Manager

cc: Senator Orrin Hatch  
Senator Jake Garn  
Representative Howard Nielson  
Lee M. Thomas, Administrator  
David Schaller, Chief Superfund Program, Region VIII  
J. Winston Porter, Assistant Administrator/Solid Waste



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII

ONE DENVER PLACE — 999 18TH STREET — SUITE 1300

DENVER, COLORADO 80202-2413

NOV 3 1985

Ref: 8HWM-SR

Ms. Arlene Loble  
City Manager  
City Hall  
Park City Municipal Corporation  
P. O. Box 1480  
Park City, Utah 84060

Dear Ms. Loble:

This is in response to your October 22, 1985 letter requesting information on mining sites on or proposed for the National Priorities List (NPL). A response to your second letter of October 22nd is being prepared and will be sent shortly.

I have no problem serving as your principal point of contact in the Region VIII Superfund program. However, EPA policies may at times require correspondence to be signed by persons other than myself. Other than in these instances, the communication protocol you suggest is fine.

The answers to the twelve questions you posed are for the most part found in the two enclosed tables: 1) "Mining and Mining Related NPL and Proposed Sites," (a list of the 38 mining and mine related sites nationally that EPA has placed on, or nominated for, the National Priorities List), and 2) "Status of Superfund Mining-Related Sites, EPA Region VIII," (site specific information on the 16 mining related NPL sites in Region VIII). Table I was prepared prior to the nomination of the Silver Creek Tailings site and thus does not reflect NPL Update 4, announced September 5, 1985.

For the mining related sites in EPA Region VIII, Table II provides responses to questions 1-5, 7, and 10. We do not maintain or have easy access to information on mining related sites outside of Region VIII that are in the remedial investigation or feasibility study stage. You should contact the appropriate EPA Regional office with jurisdiction over these sites for more information. We do, however, have information on mining sites from other Regions where the Agency has issued a record of decision selecting a remedial action. Copies of these records of decision are enclosed.

In question 6, you ask what data is available to compare sites. I have to emphasize that, at the NPL nomination stage of the Superfund process, no comparisons among sites are done or required by EPA for the purposes of ranking. Comparisons, in the sense of applying knowledge on a technical subject affecting selection of remedy, only occur later at the remedial investigation/feasibility study and record of decision stages of the Superfund process. I know you were trying to contact some of our Headquarters officials on this.

When the state-of-the-art of a given mine waste site technical issue is advanced as a result of remedial work or study at an NPL site, then all future mine waste site investigations may benefit. An example would be the application of knowledge regarding geochemistry and contaminant migration learned at one site to considerations of a remedy at another site at some later point in time. The range of technical issues where new knowledge on mine waste sites is continually being gained is extensive, particularly when private sector and other government research efforts are taken into account. EPA is committed to the application of state of the art of techniques when selected and designing remedies at mine waste NPL sites. We will be comparing among lessons learned nationwide as we approach clean up actions at our Region VIII mine waste sites.

Regarding your request in question 8, only the Milltown site in Montana (see Table II) has a remedial action near completion. There have been no mining sites in Region VIII cleaned up under Superfund, though some of these sites are near the end of the remedial investigation process and will be candidates for remedial action in FY 87 (less than 11 months away).

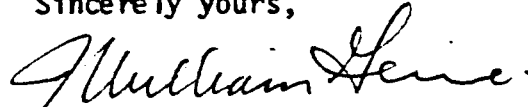
In response to question 11, no Superfund money spent to date on Region VIII mining sites has been recovered, as EPA frequently waits until completion of the remedial action at a site before attempting to recover costs from responsible parties. In some instances (see Table II), responsible parties have agreed to conduct the remedial investigation and feasibility study at NPL mining sites, in effect saving Superfund dollars for other sites.

At this time, it is not possible to state how much money will be recovered in the future at NPL sites in Region VIII, mining or otherwise, as each cost recovery action may require lengthy negotiations and possibly court proceedings. It is EPA policy to offer responsible parties the opportunity to conduct the remedial action at a site before Superfund money is used, thus eliminating the need for cost recovery after the fact. Nationwide to date, EPA has recovered nearly half a billion dollars in costs from responsible parties at NPL sites.

Table II indicates those Region VIII mining sites where no responsible parties have been identified to date and where remedial investigation work is now underway. These sites are those identified as "Fund lead." This information relates to question 12 in your letter.

I hope the enclosed information is responsive to your request. Our response to your second letter will be provided in a couple of days.

Sincerely yours,



J. William Geise, Chief  
Superfund Remedial Branch

Enclosures

cc: K. Land  
D. Schaller  
K. Alkema  
K. Lloyd  
NPL Docket: Silver Creek Tailings

Current as of September 30, 1985

STATUS OF SUPERFUND MINING-RELATED SITES

EPA Region VIII

Site/Location	Problem	NPL Date	HRS Score	Lead	Status	Superfund \$ Est. Cost	\$ Spent Expend.
California Gulch Leadville, CO	Acid mine drainage, complex ore tailings	Final (P:12/82)	55.84	Enf.	RI complete in 1/86; FS complete in 4/86	\$1024K	\$771K
Clear Creek/Central City, CO	Acid mine drainage, complex ore tailings	Final (P:7/82)	51.39	Fund	RI began 6/85; RI/FS complete in summer 1986	548K	94K
Denver Radium Denver, CO	Radium tailings contamination in soils at 31 locations	Final (P:10/81)	44.11	Fund	Master RI complete 10/85, FFS on disposal completed 6/85, 11 FS due 10/85 to 3/86	704K	538K
Lincoln Park Canon City, CO	Radium tailings, uranium and molybdenum in groundwater	Final (P:9/83)	31.31	Enf.	Limited RI by USGS complete in 12/85. Part of State of Colo. Natural Resource Damage Claim action	150K	145K
Eagle Mine Minturn, CO	Acid mine drainage, complex ore tailings leaching to groundwater and surface water	P:10/84	47.19	Enf.	No action; negotiating with State as part of Natural Resource Damage Claim action	92K	2K
Uravan Uravan, CO	Radium tailings. Uranium and radium in soils and groundwater	P:10/84	43.53	Enf.	No action, pending action by State on Nat. Res. Damage Claim	0	0
Smuggler Mine Aspen, CO	Complex ore tailings. Lead and cadmium in air, soils, and groundwater	P:10/84	44.71	PRP	RI began 7/85. FFS study by PRP completed 8/85. Final RI/FS due 12/85	393K	167K (OS)
Anaconda Smelter Anaconda, MT	Copper smelter, copper tailings, Heavy metals in groundwater, surface water, air.	Final (P:12/82)	58.71	PRP	RI/FS conducted in six tracks. RI underway on 5 tracks, started 10/84, finish 10/87	1500K	473K (OS)
East Helena Site E. Helena, MT	Lead smelter. Lead contamination in air and soils	Final (P:9/83)	61.65	Enf./ PRP	RI completed by 3/86.	560K	473K

Milltown Reservoir Milltown, MT	Copper tailings leaching to groundwater.	Final (P:12/82)	43.78	State	First RI/FS/Record of Decision on water supply problem completed, remedial action near completion. Second RI/FS on source control and off-site problem near completion.	1187K (State) 90K (OS)	975K 74K
Silver Bow Creek Butte/Deer Lodge, MT	Acid mine drainage, copper tailings.	Final (P:8/82)	63.76	State	RI completed in 3/86, FS 10/86.	1325K (State) 75K (OS)	903K 3K
Whitewood Creek Black Hills, SD	Gold tailings	Final (P:10/81)	63.76	PRP	RI completed 5/85. Endanger- ment assessment in progress. FS pending.	0	0
Mayflower Mountain Wasatch Co., UT	Complex ore tailings	P:10/84	46.42	State	Draft PRP search and workplan under development.	30K	--
Monticello, UT	Radiation contamination in structures using radium tailings in construction.	P:10/84	35.03	DOE	RI workplan under development. DOE doing remedial work.	40K (OS)	--
Olson/Neihart Reservoir Wasatch Co., UT	Complex ore tailings from Mayflower Mountain	P:10/84	33.75	State	RI to begin in fall 1985.	460K	--
U.S. Smelting Midvale, UT	Smelter tailings contaminating air, surface water and groundwater.	P:10/84	73.49	State	RI/FS to begin in fall 1985, completed in 12/87.	413K	--
Silver Creek Tailings Park City, UT	Complex ore tailings.	P:9/85	38.40	--	Public comment period on proposal ends 11/18/85.	--	--

NOTES:

1. NPL Date: Indicates if NPL listing is final and date of proposal.
2. HRS Score: Final or proposed score from the Hazard Ranking System model for inclusion on the NPL.
3. Lead: PRP -- Potentially Responsible Party is funding and conducting the remedial actions.  
Enf. -- Enforcement lead site where, even though PRPs have been identified, EPA is conducting all or a portion of the remedial actions using Superfund money, which will be recovered later from the PRF Fund -- Site where a PRP has not been identified, so Superfund money is funding the remedial actions.  
State -- Sites where a state is responsible for the remedial actions through a cooperative agreement with EPA to use Superfund money.
4. Status: RI (remedial investigation); FS (feasibility study); FFS (focused feasibility study).
5. Superfund Money Spent: Estimated costs are the costs to complete the phase of the project indicated in the status column. Money expended is Superfund costs spent through September 1985 for contractor field work or oversight assistance (OS) and state cooperative agreements.



Office of City Manager

RECEIVED  
OCT 17 1985

Superfund  
Remedial Branch

October 14, 1985

Mr. William Geiss  
Environmental Protection Agency  
One Denver Place  
999 18th Street  
Denver, Colorado 80202

Dear Bill:

Enclosed are copies of Freedom of Information requests made by Park City regarding the proposing of Prospector/Silver Creek for the NPL.

I thought that you would appreciate knowing what questions we are asking. I would also like to solicit your help in obtaining information in our requests that is not obtainable through Freedom of Information.

Your forthright and professional approach to this matter has been greatly appreciated. Thank you for your help.

Sincerely,

  
Arlene Loble  
City Manager



Legal Department

October 14, 1985

Mr. Douglas H. Ginsburg  
Administrator  
Office of Management and Budget  
Office of Information and Regulatory Affairs  
Executive Office Building  
Washington, D.C. 20503

Dear Mr. Ginsburg:

This is a Freedom of Information request pursuant to the Freedom of Information Act.

Park City Municipal Corporation requests all correspondence, memoranda, written directives and other written information found within the files of the Office of Management and Budget referring to: (1) The deferral of Silver Creek Tailings, Park City, Utah from Update Number 3(50 FR 14115, April 10, 1985) of the Environmental Protection Agency's National Priority List. (2) The subsequent decision by the Office of Management and Budget to allow the listing of Silver Creek Tailings, Park City, Utah on Update Number 4 (50FR 37950-5, September 18, 1985).

I have enclosed a check for \$25.00 to defray costs for research and copying. If additional funds are needed please call.

Thank you for your help.

Sincerely,

J. Craig Smith  
Assistant City Attorney

October 8, 1985

Freedom of Information Officer  
Environmental Protection Agency  
Region 8  
Suite 900  
1860 Lincoln Street  
Denver, Colorado 80203

RE: Silver Creek Mine Tailings Site  
Park City, Utah

Dear Freedom of Information Officer:

This is a Freedom of Information request pursuant to 5 U.S.C. § 552 et seq. for the following written information regarding:

A. The Silver Creek Tailings, Park City, Utah proposed for inclusion on the National Priorities List (NPL) in the Federal Register, Vol. 50 No. 181, Wednesday, September 18, 1985:

1. All scientific and technical data regarding the site including but not limited to, environmental baseline studies, water quality samples (both surface and groundwater), soil samples, chemical analyses, maps, photographs, well logs, reports or studies that may pertain to Silver Creek Tailings, Park City, Utah.
2. All correspondence, memoranda, notes of telephone conversations, logs of conversations and drafts of partially completed forms of the above. Authorized by EPA officials or others found in EPA files, pertaining to or mentioning Silver Creek Tailings, Park City, Utah.
3. All information regarding Mitre Corporations quality assurance evaluations of the HRS scoring of Silver Creek Tailings, Park City, Utah.
4. All documents, reports, memoranda or information regarding the identification of potentially responsible parties (PRP) for recovery of costs of remedial action on Silver Creek Tailings, Park City, Utah.

B. For other NPL and proposed NPL sites we are requesting the following information:

1. All Hazardous Ranking System (HRS) scoring sheets, memoranda, comments filed, consent decrees, legal documents, correspondence, scientific data for the Smugglers Mountain, Aspen, Colorado proposed NPL site.

C. General Information:

1. All criteria, protocol, procedures including Quality Assurance Quality Control (QAQC) procedures for collecting water samples to be used in making an HRS ranking, or for any other testing by EPA or contract agency.
2. All permits, including NPDS permit, discharge data, scientific data, memoranda, correspondence and other written information concerning the Park City Mines Tailings Pond located at Richardson Flat in Park City, Utah and owned by United Park City Mines Company.
3. All permits, including NPDS permit, discharge data, scientific data, memoranda, correspondence and other written information concerning the Kennecott Tailings Pond located in the Salt Lake Valley and owned by Kennecott Copper Corporation.

Enclosed is a check in the amount of fifty (\$50.00) dollars, for the costs of complying with the above request. If additional funds are necessary, please contact me at (801)649-9321.

Yours truly,

J. Craig Smith  
Assistant City Attorney

October 8, 1985

Jeralene Green  
Freedom of Information Office  
Environmental Protection Agency  
(A-101)  
401 "M" Street, S.W.  
Washington, D.C. 20460

Dear Ms. Green:

This is a Freedom of Information Request, pursuant to 5 USC 552 et seq. for information found in the files of the Environmental Protection Agency:

1. The HRS scoring sheets together with backup and technical data used to propose the following sites for the NPL together with all comments filed and additional scoring sheets correction and all other reports, memoranda, letters and other data:
  - a. Allen Transformer, Ft. Smith, AK
  - b. Crittenden County Landfill, Marion, AZ
  - c. Kingman Airport Industrial Area, Kingman, AZ
  - d. Ft. Lincoln Barrel Site, District of Columbia
  - e. Old Brine Sludge Landfill, Delaware City, DE
  - f. Flynn Lumber Company, Caldwell, ID
  - g. Parrott Road Dump, New Haven, IN
  - h. Littlefield Township Dump, Oden, MI
  - i. Plastifax, Inc, Gulfport, MS
  - j. Phillips Chemical Co, Beatrice, NE
  - k. Van Dale Junkyard, Marietta, OH
  - l. Rosch Property, Roy, WA
2. All correspondence, memoranda, reports, internal and external communications and position papers concerning the inclusion of mine waste sites on the National Priorities List (NPL).
3. All correspondence, memoranda, reports, internal and external communications, and position papers in regard to the applicability of the Surface Mine Reclamation and Control Act of 1977 (SMCRA) to mine waste sites.
4. All correspondence, memoranda, reports, internal and external communications and position papers on the inclusion or exclusion of Silver Creek Mine Tailings

site on the April and September updates to the NPL. Without limiting the above, including all communications between the EPA and the Office of Management and Budget concerning the inclusion or exclusion of Silver Creek Tailings, Park City, Utah on the NPL.

5. All mine waste sites currently on or proposed for the NPL together with HRS scores, and comments filed and corrections or changes to the HRS ranking.
6. All communications, memoranda, correspondence, reports, studies by or between the EPA and Mitre Corporation concerning the applicability and use of the "Mitre Model" HRS ranking system to mine waste sites.
7. All reports, memoranda and other written information on the topic of standards for the scope of remedial action, "how clean is clean" or developing standards to determine what amount of remedial action is necessary at mine waste sites.

I have enclosed a check for fifty (\$50.00) dollars to apply to the costs of the above request. If further funds or information is necessary, please contact me. Thank you for your assistance.

Yours truly,

J. Craig Smith  
Assistant City Attorney



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION VIII

ONE DENVER PLACE — 999 18TH STREET — SUITE 1300  
DENVER, COLORADO 80202-2413

REF 8RC

J. Craig Smith  
Assistant City Attorney  
Park City Legal Department  
445 Marsac Avenue  
P.O. Box 1480  
Park City, Utah 84060

Re: RIN-0293-85

Dear Mr. Smith:

Enclosed are the documents which we hope will satisfy your Freedom of Information Act (FOIA) request.

The documents in the following list are enclosed in response to subparts A1-3 and A5-6 of your request. In response to number A4 of your request, the Environmental Protection Agency (EPA) does not, as yet, have any documents pertaining to potentially responsible parties at the Silver Creek site.

The following documents are enclosed:

- o Minutes of 7/23/85 Meeting with Park City Officials
- o Summary of Dust Sampling Data 6/13/84
- o Site Inspection Report for Prospector Square and 8/30/84 Cover Letter
- o Site Description
- o 10/16/85 Letter from Schaller to Loble
- o 6/19 Memo from Schaller to Duprey
- o ROC, Loble to Lloyd 10/18/85
- o 9/5/85 Letter from Loble to Johnson
- o 8/29/85 Letter from Johnson to Ivie
- o 4/26/85 Letter from McGraw to Dingell
- o 7/25/85 Letter from Alkema to Duprey
- o 12/2/83 Letter from Loble to Stapley
- o 11/23/83 Memo from Skowronski to Johnson
- o Boring Logs and Data for Prospector Square, CMS
- o EPA Site Inspection Report for Prospector Square
- o Blood Lead Levels for Prospector Square

- o Prospector Square Data, Skowronski to Brink
- o Utah Letter of 1/31/84 to Park City Residents
- o Mitre Scoring Sheets and Associated ROCs.

The file on the Smuggler Mountain site is quite large, encompassing approximately 1,250 documents. In order to save Park City money, I am enclosing a copy of a list of all the documents in that file. Please choose the documents which you would like copied and put the document numbers on a separate list. We need this original complete list of documents returned to us. Do not make marks on the complete list.


I have enclosed several documents in response to Part C of your request. They are listed below:

- C1. Minimum Quality Assurance (QA) Requirements for the Collection and Analysis of CERCLA Samples.
- C2. EPA does not have NPDES permits for tailings ponds at Richardson Flats; rather, there is an NPDES permit for underground mine drainage. Please let us know if you would like this document.
- C3. NPDES permits for Kennecott Utah Copper Division Mine and Dump Leach Operation. Violation Code and Hierarchy Report for same. Copies of the complaint and consent order are available at the Federal District Court for Utah.
- C4. The multi-site cooperative agreement between Utah and EPA.

The total number of pages copied is 449. At \$.20 per page, duplicating costs are \$89.80. Since you have prepaid \$50, please forward a cashier's or certified check in the amount of \$39.80, payable to the U.S. Environmental Protection Agency, Collection Officer, 8PM-GFM, 999 18th Street, Suite 1300, One Denver Place, Denver, Colorado 80202-2413.

If you have any questions, please call Matt Cohn, an attorney in this office, at (303) 293-1468. In addition, please send Mr. Cohn all of your future requests.

Sincerely,

  
Thomas A. Speicher  
Regional Counsel

Enclosure

MEETING ON SILVER CREEK TAILINGS SITE

November 14, 1985

EPA OFFICE, DENVER

Persons attending:

<u>NAME</u>	<u>REPRESENTING</u>	<u>PHONE</u>
Bill Geise	EPA Superfund Branch	303-293-1519
Bob Duprey	EPA Hazardous Waste Management Division	303-293-1720
Larry Bardwell	Utah Bureau of Solid and Hazardous Waste	801-533-4145
Kelcey Yarbrough Land	EPA Superfund Program	303-293-1519
Matt Cohn	EPA Regional Counsel	301-293-1468
Ken Alkema	Utah Division of Environmental Health	801-533-6121
Arlene Loble	Park City	801-644-9321
Tom Clyde	Park City	801-644-9321
Ronald Crittenden	Congressman Howard Nielson	801-654-1144
	Utah 3rd District	801-377-1776
Craig Smith	Park City	801-649-9321
Ron Ivie	Park City	801-649-9321
John Hopkins	Park City (Dames & Moore)	303-232-6262
Ken Lloyd	EPA External Affairs	303-293-1700
David Schaller	EPA Superfund Program	303-293-1519

Duprey: Set the ground rules for discussion involving proposed regulations under comment period.

ALKEMA: Discussed State review and comment on HRS scoring package. Stated his belief that there was not enough evidence in package to show interconnection of aquifers. Thus HRS scoring for groundwater incorrect and ground water route should not be scored. Requested that EPA review State's comment package.

Ivie: Supported State's conclusion that site should not be scored.  
Introduce John Hopkins of Dames & Moore.

Hopkins: Explained Park City's comment package. Stated that there are only two wells of concern, but both of those to be connected to city water. City collects water from old mine tunnels and from springs. State has tested this water and it meets all drinking water standards.

Discussed Pacific Bridge Well. Currently has an ammonia problem - but only used in water supply emergencies. Has not been used since 1983. Springs are located upgradient and have a lot of flushing.

Stated that HRS surface water runoff sample was taken when there was an ice layer on Silver Creek. Therefore, sample was not representative. State data (sampling in September 1985) is the only valid sampling data. This data shows no observed release of tailings. In addition, some of the mine tailings have been covered up with topsoil since samples taken.

Contended that there is actually less irrigated acreage than scored in the HRS package.

Loble: Claimed that Mitre conversation (Johnson to Holmes of U.S.G.S) not sufficient as evidence of interconnection documentation.

Claimed that less irrigated acreage than scored in HRS package.

Expressed that NPL Listing is a stigma and the process is unfair. Felt that Mitre people contacted wrong people in asking questions. City has borne great economic burden in producing comments. City objects to any RI/FS work until comments answered. City has contracted to cover tailings with target date June 1986.

Duprey: EPA has SCAP flexibility in scheduling work at the site. Direct contact may have been big problem at site. Although not a basis for scoring, may be cause for removal action.

Loble: Complained about length of time involved in HQ review of comments.

Hopkins: Will transmit to EPA HQ, Region, and State copy of final comment package.

ROBERT W. BARNETT, M.D.  
ROBERT J. EVERS, M.D.  
ROBERT H. FUNKE, M.D.  
DOUGLAS R. HADLEY, M.D.  
DAVID L. HEASTON, M.D.  
ITA M. KILLEEN, M.D.  
BARBARA D. REED, M.D.  
THOMAS L. SCHWENK, M.D.  
ROBERT T. WINN, M.D.  
FRED K. BOEDE—EXEC. DIR.



9/18/85  
HOLY CROSS FAMILY HEALTH  
AND EMERGENCY CENTER  
P.O. BOX 1900  
PARK CITY, UTAH 84060  
(801) 649-7640

NPL-04-3-93

November 13, 1985

Russell H. Wyer, Director  
Hazardous Site Control Division  
Attn: NPL Staff  
Office of Emergency and Remedial Response  
(WH-548E)  
Environmental Protection Agency  
401 M Street S.W.  
Washington, D.C. 20460

Re: Proposed Listing of Silver Creek Tailings,  
Park City, Utah to the National Priorities List.

Dear Mr. Wyer:

For approximately the last two years I have been involved with the developments concerning the Prospector Square area of Park City, Utah known to the EPA as Silver Creek tailings. My position in relation to this area is somewhat unique - property owner, parent of children who have grown up there, physician for numerous children who reside there, and the City's representative to the County Health Board - as such I have had major interest in finding out about any health problems to residents.

When the City first discovered high metal concentrations in that area, the City manager asked me what risk residents faced. I then spent two weeks calling every heavy metals expert in the country to discuss the findings. All had the same answer, that to the best of their knowledge if the culinary water tested okay, there should not be a health hazard. Fortunately, the culinary water had tested in the normal range repeatedly.

OPERATED BY  
HOLY CROSS HOSPITAL

COALVILLE HEALTH CENTER  
P.O. DRAWER 11  
COALVILLE, UTAH 84017  
(801) 336-4403

MAGNA HEALTH CENTER  
8370 WEST 3500 SOUTH  
MAGNA, UTAH 84044  
(801) 250-9638

SOUTHEAST HEALTH CENTER  
1950 EAST 7000 SOUTH  
SALT LAKE CITY, UTAH 84121  
(801) 943-6111

ADMINISTRATIVE OFFICE  
HOLY CROSS HEALTH CENTERS  
1002 EAST SOUTH TEMPLE  
SALT LAKE CITY, UTAH 84102  
(801) 350-4221

MOREAU HEALTH CENTER  
1002 EAST SOUTH TEMPLE  
SALT LAKE CITY, UTAH 84102  
(801) 350-4461

SOUTHWEST HEALTH CENTER  
3590 WEST 9000 SOUTH  
WEST JORDAN, UTAH 84084  
(801) 566-5667

HOLY CROSS PARK CITY  
AMBULANCE SERVICE  
EMERGENCY NUMBER 649-9561  
OFFICE NUMBER 649-7640

Russell H. Wyer  
Page 2  
November 13, 1985

Shortly thereafter, the Utah State Health Department, the Environmental Agency, and, unfortunately, the news media learned of the heavy metal's presence. The news media made the story a "the worst health hazard in Utah". The State Health Department did a blood lead study in November of 1984 which showed no significant elevation of blood lead statisticly in Prospector children versus a control group, though with newly lowered standards there was a cluster of elevated values (which incidentally when repeated by private lab were well within normal limits save one child who had possible lead paint exposure). The EPA followed along, and on the basis of a single test of ice known as the "snowball" test, and some suppositions on ground water, placed Prospector on the proposed Superfund List.

I am quite certain that the other enclosed letters and documents detail the errors with the scoring, the tests, and the process so I won't dwell on those issues. Rather, I wanted to be sure the reader realized that as a practicing physician in the area with major professional and personal interest in this problem, I have not seen a single patient with signs or symptoms of heavy metal poisoning in eight years of Park City practice. This would reflect all testing done to date as well as the experts opinions.

I feel putting Prospector on the Superfund list would be ridiculously unscientific as there is no evidence of imminent health hazards. I hope the EPA will not chose to waste dollars spent better elsewhere.

Sincerely,

*Robert T. Winn, M.D.*

Robert T. Winn, M.D.  
*sk*

RTW/sck



STATE OF UTAH  
DEPARTMENT OF HEALTH

RECEIVED  
11/18/85

NORMAN H. BANGERTE, GOVERNOR

SUZANNE DANDY, M.D., M.P.H., EXECUTIVE DIRECTOR

13 November 1985

NPL-04-3-92

Mr. Russel H. Wyer  
Director, Hazardous Site Control Division (Attn. NPL Staff)  
Office of Emergency and Remedial Response (WH 548E)  
U.S. Environmental Protection Agency  
401 M Street, S.W.  
Washington, D.C. 20460

Re: Silver Creek Tailings Site

Dear Mr. Wyer:

Please find enclosed comments by the State of Utah on EPA's proposal to list the Silver Creek site on the Superfund National Priorities List (NPL).

As our comments reflect, it is the State's position that EPA's record does not support the proposed listing. The record does not contain adequate information to support a Hazard Ranking System (HRS) score for any route, groundwater, surface water, or air. Therefore, for purposes of the proposed listing, a score of zero would have to be assumed for the site.

The EPA's HRS scoring for the Silver Creek site was based on certain critical assumptions regarding groundwater use and geohydrology in the area which were not properly documented or otherwise substantiated in the record. Listing sites without adequate documentation only serves to raise unfounded and potentially unnecessary concerns about the site.

We have repeatedly urged EPA to require more thorough preliminary assessments and site investigations before scoring and recommending sites for the NPL. Listing solely on the basis of assumptions undermines the validity of the Superfund process and calls into question the credibility of those responsible for its implementation.

The State of Utah strongly supports the Superfund program, and we desire to continue to work closely with EPA to make it effective in Utah. In doing so, however, we must assure the integrity of the program by developing a sound technical basis for our decisions. Unfortunately, we find that such a technical basis was not developed prior to proposing the Silver Creek Tailings Site for the NPL.

Sincerely,

A handwritten signature in cursive script, reading "Kenneth L. Alkema".

Kenneth L. Alkema, Director  
Division of Environmental Health

LP/lp

Enclosure

cc: John A. Wells, Regional Administrator, EPA Region VIII

13 November 1985-

Review of EPA'S Documentation for  
Proposal of Silver Creek Tailings Site  
to the National Priorities List

1. Background:

The following is the Utah Bureau of Solid and Hazardous Waste's technical review of EPA's documentation supporting its proposal of the Silver Creek Tailings Site to the National Priorities List (NPL).

The documentation EPA has provided to the State as the basis for the proposed listing is the Hazard Ranking System (HRS) Score Sheet reviewed by Eric Johnson, dated January 15, 1985, and the Documentation Records (DR) for Hazard Ranking System prepared by Eric Johnson, EPA Region VIII, and R. Channing Johnson, the MITRE Corp. (EPA consultant), dated February 7, 1985. Reference 13 of the Documentation Records, USGS 7 1/2' maps: Park City East, Utah (1955) and Park City West, Utah (photorevised, 1975), were not included with the copy of the docket submitted to the State for review.

2. References:

In addition to the references included in EPA's Documentation Records, the Bureau's comments reference the following:

- a. Park Meadows/Park City Hydrology Study, J.J. Johnson & Associates, July 1983. (cited as J.J. Johnson 1983 report)
- b. Results of Silver Creek Surface Water Samples taken September 24, 1985. (Attachments A-D of this Review)
- c. Park City Water Resources Study, J.J. Johnson & Associates, November 1982. (cited as J.J. Johnson 1982 report)
- d. Memo, telephone conversation, Bardwell, Utah Bureau of Solid and Hazardous Waste, to Higginson, Higginson/Barnett Consultants (Attachment E of this Review).
- e. U.S. Geological Survey, Geologic map of Park City Quadrangle, Washington, D.C., 1971. (cited as USGS map, Park City, 1971)

3. Comments: -

3.A. Groundwater Route:

3.A.1. Route Characteristics:

a. EPA's HRS scoring and documentation assume that the aquifers in the vicinity of the site (Silver Creek Tailings located in Prospector Square, referred to as Site) function as a single hydrologic unit. However, the only documentation provided for this conclusion is a memorandum of a telephone conversation between R. Channing Johnson, and Watt (sic) Holmes, USGS, in which Mr. Holmes states that more than one aquifer exists in the vicinity of the Site and that those aquifers are interconnected. (EPA DR Reference 12) Mr. Holmes cites as support for this statement an unspecified pump test on a Park Meadows well and simply refers Mr. R. Channing Johnson to a J.J. Johnson & Associates for details regarding this and other wells in the Site vicinity.

For several reasons, this documentation is inadequate to support the conclusion that aquifers in the vicinity of the Site function as a single hydrologic unit:

(1) The summary conclusion fails to provide any of the specific information necessary to enable the reviewer to evaluate the basis for or validity of the conclusion. The conclusion is not supported by a documented, credible technical report verifying the hydrologic connections of aquifers described.

Failure to provide this information in the Document Records alone prevents scoring of the Site based on the assumption that the aquifers in the Site vicinity function as one hydrological unit.

(2) The Bureau has reviewed data and conclusions from a pump test of the Park Meadows and Pacific Bridge wells conducted from February to April 1983 by Higginson/Barnett Consultants and interpreted by J.J. Johnson & Associates in the Park Meadows/Park City Hydrology Study, J.J. Johnson & Associates, July 1983. The Bureau understands from Mr. Walt Holmes, USGS, that this Higginson/Barnett pump test is the same pump test referenced in Mr. Holmes' telephone conversation with R. Channing Johnson in EPA's DR Reference 12. (Telecon memo, Attachment E). This 1983 report does not support the conclusion that the aquifers in the vicinity of the Site function as one hydrologic unit. The Bureau has been unable to locate additional information that would establish that this hydrologic connection does or does not exist.

The pump test interpreted in the J.J. Johnson 1983 report involves the following wells, spring, and pond:

- The Pacific Bridge well, the only well located on the Site. Well logs indicate the well is completed in the Woodside formation. (J.J. Johnson 1982 report, p. 244) The J.J. Johnson 1983 report claims that this well is also completed into the Park City formation. (J.J. Johnson 1983 report, p. 8)

- The Park Meadows well, located approximately 3/4 mile WNW of the Site. Well logs indicate this well is completed in the Thaynes formation. (J.J. Johnson 1982 report, p. 264)

- The Cartier well, located approximately 1/4 mile NW of the Site. Information available does not adequately identify or document the aquifer supplying this well. The J.J. Johnson 1983 report claims this old, hand-dug well is completed in the Thaynes formation. (J.J. Johnson 1983 report, p. 27) However, J.J. Johnson also concludes from the pump test described in that report that the Cartier well operates independently of the Park Meadows well pumping the Thaynes formation. (J.J. Johnson 1983 report, p. 28) The basis of this conclusion appears to contradict the hydrographs of the pump test in the report which demonstrate a distinct relationship between the Cartier well and the nearby Dority spring, which is in the Thaynes formation. (J.J. Johnson 1983 report, Appendix G) A geologic cross section of the Site vicinity indicates the Cartier well could have been completed in either the alluvium or the Thaynes formation. (J.J. Johnson 1983 report, Appendices A and C; USGS map, Park City, 1971)

- Dority Spring, located just over 1/4 mile NNW of the Site. The spring is fed primarily by the Thaynes formation. (J.J. Johnson 1983, p. 27; State of Utah, Department of Natural Resources, "Water Resources of the Heber-Kamas-Park City Area," Technical Publication No. 27, 1970)

- The Dority pond, located at the source of Dority spring. The pond appears to fluctuate with the spring. (J.J. Johnson 1983 report, Appendix G)

A geologic cross section showing the lithologies and dip of rock units underlying the Site (J.J. Johnson 1983 report, Appendices A and C; USGS map, Park City, 1971) indicates that alluvium and the Woodside and possibly Park City formations underlie the Site. The Thaynes formation may underlie the Park Meadows and Cartier wells and the Dority spring and Dority pond, but does not underlie the Site.

The only conclusion that may be drawn from the J.J. Johnson 1983 report is that a hydrologic connection exists between the Park Meadows well and the Dority spring and Dority pond, and between the Park Meadows well and the Cartier well. (J.J. Johnson 1983 report, Appendix G).

No conclusions can be drawn from the 1983 report regarding the existence of any hydrologic connection between the Park Meadows well and the Pacific Bridge well. During the pumping of the Park Meadows well, water levels were apparently not taken, or at least were not reported for the Pacific Bridge well as necessary to establish any hydrologic connection.

Further, no conclusions can be drawn from the 1983 report regarding the existence of any hydrologic connection between the Pacific Bridge well and the Dority spring and Dority pond, or between the Pacific Bridge well and the Cartier well, or between the Pacific Bridge well and shallow valley fill (alluvial) aquifer for the following reasons:

- The pumping rate on the Pacific Bridge well (80 gpm) was probably too low to stress the Cartier well or the Dority spring or Dority pond. The Pacific Bridge well is capable of a sustained yield of approximately 250 gpm.
- Water level measurements were not taken in the Park Meadows well during the pumping of the Pacific Bridge well. The pumping rate would probably have been too low in the Pacific Bridge well to stress the Park Meadows well in any event.
- Apparently no observation wells have been finished in the alluvial aquifer overlying the Site to establish a hydrologic connection between the deeper aquifer the Pacific Bridge taps and the shallow overlying alluvial aquifer.

The information and conclusions from the J.J. Johnson 1983 report on the Park Meadows and Pacific Bridge pump tests do not support the following statements of Mr. Holmes as documented in EPA DR Reference 12 regarding these same tests:

- Holmes states the Cartier well is in the alluvial aquifer. The J.J. Johnson report claims the well is located in the Thaynes formation.
- Holmes states the Pacific Bridge well was affected by the Park Meadows pumping. The information in the J.J. Johnson 1983 report does not support a determination that the Pacific Bridge well was affected by the Park Meadows pump test.

Thus, the only geologic connections between aquifers established by the J.J. Johnson 1983 report do not demonstrate that the aquifers in the vicinity of the Site function as one hydrologic unit for HRS scoring purposes.

- The only hydrologic connections established by the report are between the Park Meadows well 3/4 miles from the Site in the Thaynes formation and the Dority Spring and Dority pond and the Cartier well approximately 1/4 mile NW of the Site. The Thaynes aquifer supplies the Dority spring and Dority pond. Available information does not adequately document the aquifer supplying the Cartier well.

- The J.J. Johnson 1983 report does not support any hydrologic connection between the alluvial or Woodside or Park City formations which apparently underlie the Site and the Thaynes formation or other aquifer units affected by the Park Meadows pump test.

b. Because it is not supported, the assumption that the aquifers in the vicinity of the Site function as one hydrologic unit cannot be used for scoring the Groundwater Route for the Site. Further, the Documentation Records do not describe any of the aquifers in the vicinity of the Site, nor identify and document any aquifer of concern necessary for calculating the Depth to Aquifer of Concern as required for scoring the Groundwater Route for the Site.

### 3.A.2: Targets:

The Documentation Records cannot support the required calculations to score Targets for the Groundwater Route score (e.g., Groundwater Use; Distance to nearest well; Population served) because the aquifer of concern has not been identified and documented, and because the aquifers supplying the wells used to calculate the Target scores have not been identified or documented.

### 3.A.3. Conclusion:

The Documentation Records do not support a score for the Groundwater Route. Therefore, a score of zero would have to be assumed for EPA's HRS Score Sheet, Figure 10.

## 3.B. Surface Water Route:

### 3.B.1. Observed Release:

a. The surface water sample cited in the Documentation Records to support the Surface Water Route observed release does not appear to represent the water quality of Silver Creek. (EPA DR References 10 and 14). The downgradient sample purportedly

demonstrating a release was taken during December 1983 when Silver Creek was frozen. (EPA DR References 10 and 14) The source of this downgradient sample was snow melt runoff from the tailings onto the top of the ice, and thus cannot be assumed to represent stream conditions at the time of the sampling.

b. The Utah Bureau of Solid and Hazardous Waste, in cooperation with Park City officials, took additional water and stream sediment samples from Silver Creek on September 24, 1985. (Attachments A-D) These samples were analyzed by two independent laboratories, the Utah State Health Laboratory and Ford Laboratory. Their analyses (Attachments C & D) indicate that the tailings from the Site were not significantly affecting the background water quality in Silver Creek at that time.<sup>1</sup>

c. Because the observed release documented in the Documentation Records was based on one sample that does not appear to have represented water quality in Silver Creek, and because subsequent sampling has demonstrated no observed release from the Site, the Documentation Records cannot support a Surface Water Route score based on an observed release.

### 3.B.2. Route Characteristics:

The Documentation Records do not include the information regarding Route Characteristics that is necessary for calculating a score for the Surface Water Route absent an observed release. Thus, the Surface Water Route cannot be scored on the basis of this Record.

### 3.B.3. Conclusions:

The Documentation Records do not support a score for the Surface Water Route. Therefore, a score of zero would have to be assumed for EPA's HRS Score Sheet, Figure 10.

### 3.C: Conclusion:

EPA's Documentation Records for the Silver Creek Tailings Site do not support the proposed listing of the site to the NPL. The scores proposed for the Groundwater and Surface Water Routes are not supported by the Documentation Records. Therefore scores of zero would have to be assumed for EPA's Score Sheet, Figure 10.

---

<sup>1</sup>Although one split of the water samples showed selenium increasing from 1 ppb upgradient to 3 ppb downgradient from the Site (Attachment C & D), this difference is not a significant increase above background and does not support an observed release for HRS scoring purposes. Further, the 3 ppb of selenium was not detected in the split of this downgradient sample.

## APPENDIX A

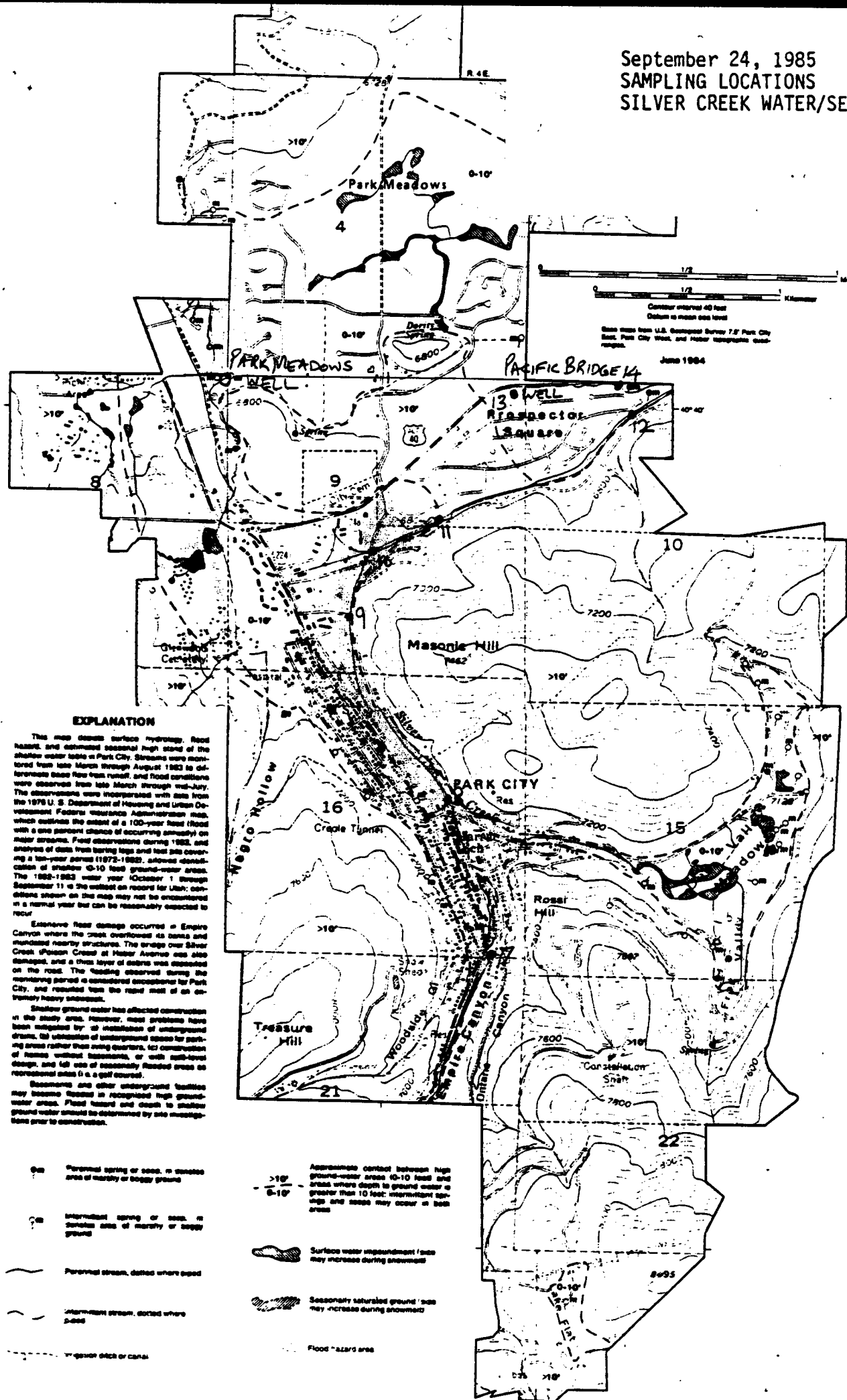
## Appendix A

SUMMARY OF SAMPLES  
Water/Sediment, Silver Creek  
Park City, Utah  
September 24, 1985

<u>Sample No.</u>	<u>Time</u>	<u>Sample Location/Number</u>	<u>Type</u>	<u>No. of Container</u>
CW85107	0945	Poison Creek Just West of City Municipal Bldg. Park City (7)	Water	2
CW85107A	0945	" "	Sediment	1
CW85108	1000	Poison Creek East of Utah Coal and Lumber (8)	Water	2
CW85108A	1000	" "	Sediment	1
CW85109	1020	Silver Creek at Masonie Hill Intersection (9)	Water	2
CW85109A	1020	" "	Sediment	1
CW85110	1030	Silver Creek at Rail Road crossing in Prospector Square (10)	Water	2
CW85110A	1030	" "	Sediment	1
CW85111	1045	Silver Creek North of R.R. track in Prospector Square (11)	Water	2
CW85111A	1045	" "	Sediment	1
CW85112	1100	Silver Creek at Wyatt Earp and Sidewinder (12)	Water	2
CW85112A	1100	" "	Sediment	1
CW85113	1200	Pacific Bridge Well Prospector Sq. (13)	Water	2
CW85114	1205	Spring at Corner of Butch Cassidy Circle and Wyatt Earp Drive (14)	Water	2
CW85114A	1205	" "	Sediment	1
CW85115	0900	Silver Creek Blank	Water	3

## APPENDIX B

September 24, 1985  
SAMPLING LOCATIONS  
SILVER CREEK WATER/SEDIMENT SAMPLING



# EXPLANATION

This map details surface hydrology, flood hazard, and estimated seasonal high stand of the shallow water table in Park City. Streamflow was monitored from late March through August 1983 to determine base flow from runoff, and flood conditions were observed from late March through mid-July. The observations were incorporated with data from the 1976 U.S. Department of Housing and Urban Development Federal Insurance Administration map, which outlines the extent of a 100-year flood (with a one percent chance of occurring annually) on major streams. Flood observations during 1983, and analyses of data from boring logs and test pits covering a ten-year period (1972-1982), allowed identification of shallow (0-10 foot) groundwater areas. The 1983-1984 water year (October 1 through September 30) is the wettest on record for Utah; conditions shown on this map may not be encountered in a normal year but can be reasonably expected to recur.

Extensive flood damage occurred in Empire Canyon where the creek overflowed its banks and inundated nearby structures. The bridge over Silver Creek (Paseo Crest at Main Avenue) was also damaged, and a thick layer of debris was deposited on the road. The flooding observed during the monitoring period is considered exceptional for Park City, and resulted from the rapid melt of an extremely heavy snowpack.

Shallow groundwater has affected construction in the study area. However, most problems have been mitigated by: (1) installation of underground drains, (2) relocation of underground spaces for parking areas rather than using quarters, (3) construction of basements without basements, or with half-level design, and (4) use of seasonally flooded areas as recreational sites (i.e., a golf course).

Basements and other underground facilities may become flooded in recognized high groundwater areas. Flood hazard and depth to shallow groundwater should be determined by site investigations prior to construction.

- Perennial spring or seep, in season area of marshy or boggy ground
- Intermittent spring or seep, in season area of marshy or boggy ground
- Perennial stream, dashed where pooled
- Intermittent stream, dotted where pooled
- Irrigation ditch or canal

- >10' / 0-10' Approximate contact between high groundwater areas (0-10 foot) and areas where depth to groundwater is greater than 10 feet; intermittent springs and seeps may occur in both areas
- Surface water impoundment / area may increase during snowmelt
- Seasonally saturated ground / area may increase during snowmelt
- Flood hazard area

## APPENDIX C

TABLE 1  
SILVER CREEK SEDIMENT SAMPLE RESULTS  
September 24, 1985  
(Results in mg/kg)  
State Health Laboratory

	85107A	84108A	84109A	84110A	85111A	84112A	84114A	84115A
Aluminum	9300	7600	10,400	11,000	8,300	10,300	17,000	<.09
Arsenic	104	88	73	48	270	63	74	<.005
Barium	12	12	25	23	12	50	18	<.5
Cadmium	31.4	45.8	27.7	22.2	25.4	29.4	31	<.05
Chromium	64	88	48	38	59	36	40	<.3
Copper	234	302	232	205	508	192	243	<.3
Iron	26,000	44,000	23,000	20,000	57,000	18,000	34,000	<.3
Lead	700	800	1300	1400	800	1100	1200	<.5
Manganese	1760	2400	2100	2100	770	1800	400	<.3
Mercury	.93	1.4	3.1	2.2	2.3	1.9	3.2	<.0002
Molybdenum	10	22	8.7	4.9	9.3	7.8	4.3	<.3
Nickel	17	17	19	18	14	15	15	<.7
Selenium	2.2	4.6	2.4	1.4	5.9	1.6	4.4	<.005
Silver	3.77	5.4	10.1	3.1	3.66	6.98	16.9	<.05
Zinc	7.22	7.92	4.49	4.21	4.29	4.57	4.3	<.2

MS:dt

7515

TABLE 2  
SILVER CREEK WATER SAMPLES RESULTS  
September 24, 1985  
(Results mg/liter)  
State Health Laboratory

	CW 85107	CW 85108	CW 85109	CW 85110	CW 85111	CW 85112	CW 85114	CW 85113	CW 85115
Aluminum	.56	.96	.42	.48	1.74	.42	0.14	.05	<.05
Arsenic	.03	.025	.012	.014	.015	.012	0.005	.001	<.001
Barium	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Cadmium	.008	.006	.003	.018	.005	.004	.025	<.001	<.001
Chromium	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Copper	.065	.1	.04	.04	.04	.035	0.01	<.02	<.02
Iron	1.07	2.04	.99	1.04	1.13	.77	.09	.05	<.03
Lead	1.6	1.1	.575	.585	.51	.47	.005	.005	<.005
Manganese	1.27	.61	.175	.155	.15	.175	.405	.01	<.01
Mercury	.003	.010	.001	.005	<.001	<.001	<.001	<.001	<.001
Molybdenum	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Selenium	.001	.005	.001	.003	.002	.002	<.001	.001	<.001
Silver	.002	.002	.002	.002	.002	.002	<.002	<.002	<.002
Zinc	1.12	.89	.515	.605	.665	.6	4.2	.04	.01
PH	7.7	8.1	8.2	8.2	8.2	8.1	6.7	8.0	.01
Hardness	393	217	210	204	178	216	1004	307	0
Alkalinity	182	137	116	111	109	109	82	111	<1
Turbidity	27	67	29	33	33	27	0.8	.2	0.1
Chloride	195	125	33	25	21	20	120	71	1
Nitrate-N	.33	1.46	.35	.23	.21	.24	0.6	<.01	<.01
Silica	23	20	21	18	18	18	15	6	1
Sulfate	213	122	110	106	104	114	800	114	5
Calcium	121	73	66	63	60	71	326	73	0
Magnesium	24	8	12	11	7	9	46	30	0

TABLE 3  
SILVER CREEK SEDIMENT SAMPLES RESULTS

September 24, 1985

(mg/kg)

Ford Laboratory

	2	3	4	6	7
Arsenic	144.920	131.130	121.7	108	136.64
Barium	47.98	82.24	88.74	72.89	99.69
Cadmium	37.061	29.011	27.414	27.2	33.622
Chromium	28.460	16.410	20.290	15.59	24.95
Copper	659.33	223.74	225.44	207.31	197.01
Iron	27,761	20,509	20,064	17,248	39,073
Lead	3,540	3,306	2,457	2,205	2,463
Manganese	2,186	1,827	2,040	1,526	426.85
Mercury	.0009	.0005	.0003	.0014	.0016
Nickle	8.1	10.94	12.85	10.12	9.52
Selenium	.007	.005	.004	.352	.746
Silver	15.8	16.290	15.56	11.79	9.459
Zinc	5,425	5,752	2,931	3,474	3,444
PH	8.0	7.65	7.85	7.75	6.15
Calcuim	112	212	139	125	2,537
Magnesium	.5	.9	.5	9.4	322.8

MS:sk

7515

Rev. 3/82

Field No.

85107

☒ TC  
☐ PC

☒ TM  
☐ PM

☐ Nut  
☐ BOD

☐ Pest.  
☐ Rad.  
☐ Bact.  
☐ Spec.

Date Recd.:

Received By:

UTAH STATE DEPARTMENT OF HEALTH

ENVIRONMENTAL HEALTH  
WATER ANALYSES

SEP 24 85 854957

Sample No. 701

Storet No.

Water Syst. No.  Source No.

Date Collected  Time Collected  Water Rights No.

yr. mo. dy. 24-hour clock

Exact Description of sampling Point

POISON CREEK  
WEST OF CITY BLDG.

Supply Owned by  Sample Type

Sample Collected by

SEND REPORT TO: Phone

J. SALMON  
4231 STATE OFFICE BLDG.  
SILCO UT

zip code

Sample Source

County

Current use  708  
Proposed use  709

1. Culinary  
2. Agriculture ☒  
3. Industrial  
4. Other

Cost Code  770

2 Temperature (°C)  650 pH  782

WASTEWATER ANALYSIS

BACT. LAB. No.

B.O.D.<sub>5</sub>  794 T.O.C.  671  
Tot. Sus. Solids  787 C.O.D.  777  
NO<sub>2</sub>+NO<sub>3</sub>-N  602 Cyanide  775  
T.K.N.  778 Phenolics  783  
Oil & Grease  780 Sulfide  673

M.P.N. Total Coliforms/100ml  658  
M.P.N. Fecal Coliforms/100ml  657  
Fecal Strip C/100ml  656  
M.F. Total Coliforms/100ml  654  
M.F. Fecal Coliforms/100ml  655  
Plate Count-Orig./ml  659

3 Filtered  Unfiltered

me/l CATIONS mg/l ug/l (ppb)

Ammonia as N  722  
Arsenic  723  
Barium  724  
Boron  725  
Cadmium  727  
Calcium  121 56 728  
Chromium  729  
Chromium, Hex. as Cr  730  
Copper  732  
Iron, dissolved  733  
Lead  734  
Magnesium  24 737  
Manganese  1135 738  
Nickel  740  
Potassium  742  
Selenium  743  
Silver  744  
Sodium  1113 745  
Zinc  415 749

6.07  
2.00  
1.8  
4.92  
13.2

TOTAL CATIONS 265

Sp. Cond.  $\mu$ mhos/cm.  1365 763  
TDS @ 180°C  852 766

4 CHEMICAL ANALYSIS

me/l ANIONS mg/l

Bicarbonate  222 758  
Carbon Dioxide  759  
Carbonate  760  
Chloride  195 763  
CO<sub>2</sub> Solids  109 765  
Fluoride  249 767  
Hydroxide  767  
Nitrate as N  033 606  
Nitrite as N  007 606  
Phosphorus, Ortho as P  01 607  
Silica, dissolved as SiO<sub>2</sub>  23 760  
Sulfate  213 772

5.49  
3.64  
444  
13.0

TOTAL ANIONS GRAND TOTAL 540 805

Tot. Phosphorus  785  
Total Alk. as CaCO<sub>3</sub>  182 782  
T. Hdns. as CaCO<sub>3</sub>  393 784  
Surfactant as MBAS  773  
Turbidity, as NTU  27 757  
Sp. Gravity  608

5 TOTAL METALS ANALYSIS

mg/l ug/l (ppb)

Aluminum  569 600  
Arsenic  295 660  
Barium  661  
Beryllium  602  
Cadmium  662  
Chromium  663  
Cobalt  604  
Copper  65 20 664  
Gold  700  
Iron  11017 765  
Lead  1600 665  
Manganese  1265 666  
Mercury  3.4 739  
Molybdenum  50 802  
Nickel  667  
Selenium  668  
Silver  2 669  
Uranium  601  
Vanadium  803  
Zinc  1120 670

6 RADIOLOGICS

Alpha, gross  631 89Sr  633  
Beta, gross  623 131I  636  
Tritium, <sup>3</sup>H  625 134Cs  637  
226 Radium  627 137Cs  639  
228 Radium  629  
90Sr  631

Analyses Approved By:  Date: 851011

By:  ENVIRONMENTAL HEALTH

INTERPRETATION OF ANALYSES:  
Remarks:

Based on State Standards, this sample was:

B.O.D.<sub>5</sub>  
Tot. Sus. Solids  
M.P.N. Total Coliform.  
M.P.N. Fecal Coliform.

Satisfactory  
Conditional  
Unsatisfactory



# TOTAL CHEM. + TOTAL METALS + DISSOLVED METALS

Rev. 3/82

Field No.

CW85109

☒ TC  
☐ PC

☒ TM  
☐ PM

☐ Nut  
☐ BOD

Pest.  
Rad.  
Bact.  
Spec.

Date Recd.:

Received By:

UTAH STATE DEPARTMENT OF HEALTH

ENVIRONMENTAL HEALTH  
WATER ANALYSES

SEP 24 85 85496

Sample No.

703

Storet No.

Water Syst. No. Source No.

Sample Source

County

Current use

Proposed use

Date Collected

Time Collected

Water Rights No.

yr. mo. day

24-hour clock

Exact Description of sampling Point

SILVER CREEK BELOW  
MASONIC HILL INTER-  
SECTION

Supply Owned by

Sample Type

Sample Collected by

SLAM HERBON

SEND REPORT TO:

Phone

5334145

J. SALMON

4231 STATE OFFICE BLDG

zip code

01 Spring  
02 Well  
03 Stream  
04 Lake  
05 Dist. syst.  
06 Lake well  
07 Effluent  
08 Storm sewer

01 Beaver  
02 Box Elder  
03 Cache  
04 Carbon  
05 Daguerre  
06 Davis  
07 Duchesne  
08 Emery  
09 Garfield  
10 Grand  
11 Iron  
12 Juab  
13 Kane  
14 Millard  
15 Morgan

1. Culinary  
2. Agriculture  
3. Industrial  
4. Other

Cost Code

1 FIELD TESTS

Temperature (°C)

D.O., mg/l

Sp. Cond.  $\mu$ mhos

pH

Sp. Gravity

Transparency, m

CO<sub>2</sub>, mg/l

Depth, m

Cl Resid., mg/l

Flow, MGD

Flow, GPM

Flow, cfs

2 Temperature (°C)

650

pH

783

WASTEWATER ANALYSIS

BACT. LAB. No.

B.O.D.<sub>5</sub>

Tot. Sus. Solids

NO<sub>2</sub>+NO<sub>3</sub>-N

T.K.N.

Oil & Grease

T.O.C.

C.O.D.

Cyanide

Phenolics

Sulfide

M.P.N. Total Coliforms/100ml

M.P.N. Fecal Coliforms/100ml

Fecal Strep C/100ml

M.F. Total Coliforms/100ml

M.F. Fecal Coliforms/100ml

Plate Count-Org./ml

3 Filtered

Unfiltered

mg/l

CATIONS

mg/l

ug/l (ppb)

Ammonia as N  
Arsenic  
Barium  
Boron  
Cadmium  
Calcium  
Chromium  
Chromium, Hex. as Cr  
Copper  
Iron, dissolved  
Lead  
Magnesium  
Manganese  
Nickel  
Potassium  
Selenium  
Silver  
Sodium  
Zinc

4 CHEMICAL ANALYSIS

mg/l

ANIONS

mg/l

Bicarbonate  
Carbon Dioxide  
Carbonate  
Chloride  
CO<sub>2</sub> Solids  
Fluoride  
Hydrosulfide  
Nitrate as N  
Nitrite as N  
Phosphorus, Ortho as P  
Silica, dissolved as SiO<sub>2</sub>  
Sulfate  
TOTAL ANIONS  
GRAND TOTAL  
Tot. Phosphorus  
Total Alk. as CaCO<sub>3</sub>  
T. Hds. as CaCO<sub>3</sub>  
Surfactant as MBAS  
Turbidity, as NTU  
Sp. Gravity

pH, units

8.2

TOTAL METALS ANALYSIS

mg/l

ug/l (ppb)

Antimony  
Arsenic  
Barium  
Beryllium  
Bismuth  
Cadmium  
Chromium  
Cobalt  
Copper  
Gold  
Iron  
Lead  
Manganese  
Mercury  
Molybdenum  
Nickel  
Selenium  
Silver  
Uranium  
Vanadium  
Zinc

5 RADIOLOGICS

Alpha, gross  
Beta, gross  
Tritium, <sup>3</sup>H  
226 Radium  
228 Radium  
90 Sr  
89 Sr  
131 I  
134 Cs  
137 Cs

INTERPRETATION OF ANALYSES:

Remarks:

Based on State Standards,

this sample was:

B.O.D.<sub>5</sub>

Tot. Sus. Solids

M.P.N. Total Coliform.

M.P.N. Fecal Coliform.

Analyses Approved By:

RED

Date: 851011

By

ENVIRONMENTAL HEALTH

TOTAL CHEN + 7014 METALS + 11555555

Rev. 3/82

Field No.

CW85110

Pest.

Rad.

Bact.

Spec.

Date Recd.:

Received By:

UTAH STATE DEPARTMENT OF HEALTH

ENVIRONMENTAL HEALTH

WATER ANALYSES

SEP 24 85 854963

Sample No.

701

Store No.

Water Syst. No. Source No.

Date Collected

Time Collected

Water Rights No.

yr. mo. dy.

24-hour clock

Exact Description of sampling Point

SILVER CREEK AT

R.R. CROSSING

Supply Owned by

Sample Type

Sample Collected by

SILAM HEBBORN

SEND REPORT TO:

Phone

573 4145

7-SALMON

4231 STATE OFFICE BLDG.

zip code

Sample Source

01 Spring

02 Well

03 Stream

04 Lake

06 Dist. syst.

07 Effluent

08 Storm

sewer

14 Other

15 Tunnel

18 Artesian

well

19 Swimming

pool

County

01 Beaver

02 Box Elder

03 Cache

04 Carbon

05 Daguerre

06 Davis

07 Duchesne

08 Emery

09 Garfield

10 Grand

11 Iron

12 Juab

13 Kane

14 Millard

15 Morgan

16 Piute

17 Rich

18 Salt Lake

19 San Juan

20 Sanpete

21 Sevier

22 Summit

23 Teton

24 Uintah

25 Utah

26 Wasatch

27 Washington

28 Wayne

29 Weber

Current use

Proposed use

1. Culinary

2. Agriculture

3. Industrial

4. Other

Cost Code

1

FIELD TESTS

Temperature (°C)

D.O., mg/l

Sp. Cond.  $\mu$ mhos

pH

Sp. Gravity

Transparency, m

CO<sub>2</sub>, mg/l

Depth, m

Cl Resid., mg/l

Flow, MGD

Flow, GPM

Flow, cfs

2

Temperature (°C)

pH

WASTEWATER ANALYSIS

BACT. LAB. No.

B.O.D.<sub>5</sub>

Tot. Sus. Solids

NO<sub>2</sub>+NO<sub>3</sub>-N

T.K.N.

Oil & Grease

T.O.C.

C.O.D.

Cyanide

Phenolics

Sulfide

M.P.N. Total Coliforms/100ml

M.P.N. Fecal Coliforms/100ml

Fecal Strep C/100ml

M.F. Total Coliforms/100ml

M.F. Fecal Coliforms/100ml

Plate Count-Orig./ml

3

Filtered

Unfiltered

me/l

CATIONS

mg/l

ug/l (ppb)

Ammonia as N

Arsenic

Barium

Boron

Cadmium

Calcium

Chromium

Chromium, Hex. as Cr

Copper

Iron, dissolved

Lead

Magnesium

Manganese

Nickel

Potassium

Selenium

Silver

Sodium

Zinc

TOTAL CATIONS

4 CHEMICAL ANALYSIS

me/l

ANIONS

mg/l

Bicarbonate

Carbon Dioxide

Carbonate

Chloride

CO<sub>2</sub> Solids

Fluoride

Hydrosulfide

Nitrate as N

Nitrite as N

Phosphorus, Ortho as P

Silica, dissolved as SiO<sub>2</sub>

Sulfate

TOTAL ANIONS

GRAND TOTAL

Tot. Phosphorus

Total Alk. as CaCO<sub>3</sub>

T. Hdns. as CaCO<sub>3</sub>

Surfactant as MBAS

Turbidity, as NTU

Sp. Gravity

pH, units

5 TOTAL METALS ANALYSIS

mg/l

ug/l (ppb)

Aluminum

Arsenic

Barium

Beryllium

Cadmium

Chromium

Cobalt

Copper

Gold

Iron

Lead

Manganese

Mercury

Molybdenum

Nickel

Selenium

Silver

Uranium

Vanadium

Zinc

6

RADIOLOGICS

Alpha, gross

Beta, gross

Tritium, <sup>3</sup>H

226 Radium

228 Radium

90 Sr

89 Sr

131 I

134 Cs

137 Cs

633

635

637

639

INTERPRETATION OF ANALYSES:

Remarks:

Based on State Standards,

this sample was:

B.O.D.<sub>5</sub>

Tot. Sus. Solids

M.P.N. Total Coliform.

M.P.N. Fecal Coliform.

Analyses Approved By:

RSD

Date: 851011

By

ENVIRONMENTAL HEALTH

# TOTAL CHEM + TOTAL METALS + DISSOLVED METALS

Rev. 3/82

Field No.

CW 85111

Pest.

Rad.

Bact.

Spec.

Date Recd.

Received By:

UTAH STATE DEPARTMENT OF HEALTH

ENVIRONMENTAL HEALTH

WATER ANALYSES

SEP 24 85 854965

Sample No.

701

Store No.

Water Syst. No. Source No.

Sample Source

County

Current use

Proposed use

Date Collected

Time Collected

Water Rights No.

yr. mo. dy.

24-hour clock

Exact Description of sampling Point

SILVER CREEK ON SITE  
OFFICE BLDG  
N. OF RR TRACK

Supply Owned by

Sample Type

Sample Collected by

SLAM / HEBDON

SEND REPORT TO:

Phone

5334145

2. SALMON  
423 STATE OFFICE BLDG.

zip code

01 Spring  
02 Well  
03 Stream  
04 Lake  
05 Dist. syst.  
06 Effluent  
07 Storm sewer  
14 Other  
15 Tunnel  
16 Artesian well  
17 Swimming pool  
18

01 Beaver  
02 Bear Eder  
03 Cache  
04 Carbon  
05 Daggett  
06 Davis  
07 Duchene  
08 Emery  
09 Garfield  
10 Grand  
11 Iron  
12 Juab  
13 Kane  
14 Kane  
15 Morgan  
16 Blaine  
17 Rich  
18 Salt Lake  
19 San Juan  
20 Sanpete  
21 Sevier  
22 Summit  
23 Teton  
24 Uintah  
25 Utah  
26 Wasatch  
27 Washington  
28 Wayne  
29 Weber

1. Culinary  
2. Agriculture  
3. Industrial  
4. Other

Cost Code

## FIELD TESTS

Temperature (°C) 792  
D.O., mg/l 793  
Sp. Cond.  $\mu$ mhos/cm 653  
pH 651  
Sp. Gravity 608  
Transparency, m 649  
CO<sub>2</sub>, mg/l 572  
Depth, m 608  
Cl Resid., mg/l 753  
Flow, MGD 652  
Flow, GPM 604  
Flow, cfs 658

2 Temperature (°C)

650

pH

782

## WASTEWATER ANALYSIS

BACT. LAB. No.

B.O.D.<sub>5</sub>

Tot. Sus. Solids

NO<sub>2</sub>+NO<sub>3</sub>-N

T.K.N.

Oil & Grease

mg/l

794

787

603

778

780

T.O.C.

C.O.D.

Cyanide

Phenolics

Sulfide

mg/l

671

777

775

783

672

M.P.N. Total Coliforms/100ml

M.P.N. Fecal Coliforms/100ml

Fecal Strep C/100ml

M.F. Total Coliforms/100ml

M.F. Fecal Coliforms/100ml

Plate Count-Orig./ml

658  
657  
656  
654  
655  
659

3 Filtered

Unfiltered

## CHEMICAL ANALYSIS

(pH, units) 8.2

me/l

CATIONS

mg/l

ug/l (ppb)

me/l

ANIONS

mg/l

TOTAL METALS ANALYSIS

Ammonia as N 722  
Arsenic 723  
Barium 724  
Boron 725  
Cadmium 727  
Calcium 728  
Chromium 729  
Chromium, Hex. as Cr 730  
Copper 732  
Iron, dissolved 733  
Lead 734  
Magnesium 737  
Manganese 738  
Nickel 740  
Potassium 742  
Selenium 743  
Silver 744  
Sodium 745  
Zinc 746  
TOTAL CATIONS 88

Bicarbonate 758  
Carbon Dioxide 759  
Carbonate 760  
Chloride 763  
CO<sub>2</sub> Solids 765  
Fluoride 767  
Hydroxide 768  
Nitrate as N 769  
Nitrite as N 770  
Phosphorus, Ortho as P 771  
Silica, dissolved as SiO<sub>2</sub> 772  
Sulfate 773  
TOTAL ANIONS 296  
GRAND TOTAL 296  
Tot. Phosphorus 785  
Total Alk. as CaCO<sub>3</sub> 782  
T. Hdns. as CaCO<sub>3</sub> 784  
Surfactant as MBAS 773  
Turbidity, as NTU 757  
Sp. Gravity 608

5 CATIONS mg/l ug/l (ppb)  
Aluminum 780  
Arsenic 781  
Barium 782  
Beryllium 783  
Cadmium 784  
Chromium 785  
Cobalt 786  
Copper 787  
Gold 788  
Iron 789  
Lead 790  
Manganese 791  
Mercury 792  
Molybdenum 793  
Nickel 794  
Selenium 795  
Silver 796  
Uranium 797  
Vanadium 798  
Zinc 799

Sp. Cond.  $\mu$ mhos/cm.

762

TDS @ 180°C

766

## RADIOLOGICS

Alpha, gross 621  
Beta, gross 623  
Tritium, <sup>3</sup>H 625  
226 Radium 627  
228 Radium 629  
90Sr 631  
89Sr 633  
131I 635  
134Cs 637  
137Cs 639

## INTERPRETATION OF ANALYSES:

Remarks:

Based on State Standards, this sample was:

B.O.D.<sub>5</sub>

Tot. Sus. Solids

M.P.N. Total Coliform.

M.P.N. Fecal Coliform.

Analyses Approved By:

R-EQ

Date: 851011

By

ENVIRONMENTAL HEALTH

# TOTAL CHEM + TOTAL METALS + DISSOLVED METALS

Rev. 3/82  
Field No. **CW85112**  
TC ☐ TM ☐ Nut ☐  
PC ☐ PM ☐ BOD ☐

Pest. ☐  
Rad. ☐  
Bact. ☐  
Spec. ☐

Date Recd.: \_\_\_\_\_  
Received By: \_\_\_\_\_

## UTAH STATE DEPARTMENT OF HEALTH ENVIRONMENTAL HEALTH WATER ANALYSES

SEP 24 85 854967

Sample No. 707

Storet No. \_\_\_\_\_  
Water Syst. No. Source No. \_\_\_\_\_  
Date Collected 703 Time Collected 1100  
Water Rights No. 707  
Exact Description of sampling Point  
**SILVER CREEK AT WYAT**  
**EARP & SIDERWINDER**  
Supply Owned by \_\_\_\_\_ Sample Type \_\_\_\_\_  
Sample Collected by **SLAM / HEBDON**  
SEND REPORT TO: Phone **5334145**  
**42315 STATE OFFICE BLDG.**  
zip code \_\_\_\_\_

Sample Source 719  
01 Spring 14 Other  
02 Well 15 Tunnel  
03 Stream 18 Artesian well  
04 Lake 19 Swimming pool  
06 Dist. syst. 07 Effluent  
08 Storm sewer  
County 611  
01 Beaver 15 Plute  
02 Box Elder 17 Rich  
03 Cache 18 Salt Lake  
04 Carbon 19 San Juan  
05 Daguerre 20 Sanpete  
06 Davis 21 Sevier  
07 Duchesne 22 Summit  
08 Emery 23 Teton  
09 Garfield 24 Uintah  
10 Grand 25 Utah  
11 Iron 26 Wasatch  
12 Juab 27 Washington  
13 Kane 28 Wayne  
14 Millard 29 Weber  
15 Morgan  
Current use ☐ 708  
Proposed use ☐ 709  
1. Culinary  
2. Agriculture ☒  
3. Industrial  
4. Other  
Cost Code ☐ 770

2 Temperature (°C) 650 pH 782 WASTEWATER ANALYSIS BACT. LAB. No. \_\_\_\_\_  
mg/l 794 T.O.C. 671 M.P.N. Total Coliforms/100ml 658  
Tot. Sol. Solids 787 C.O.D. 777 M.P.N. Fecal Coliforms/100ml 657  
NO<sub>2</sub>+NO<sub>3</sub>-N 602 Cyanide 775 Fecal Strep C/100ml 656  
T.K.N. 778 Phenolics 783 M.F. Total Coliforms/100ml 654  
Oil & Grease 780 Sulfide 672 M.F. Fecal Coliforms/100ml 655  
Plate Count-Orig./ml. 599

3 Filtered Unfiltered  
mg/l CATIONS mg/l ug/l (ppb)  
Ammonia as N < 1 722  
Arsenic 4 723  
Barium 724  
Boron 725  
Cadmium 2 727  
Calcium 728  
Chromium 729  
Chromium, Hex. as Cr 730  
Copper 732  
Iron, dissolved 733  
Lead 734  
Magnesium 737  
Manganese 738  
Nickel 740  
Potassium 742  
Selenium 743  
Silver 744  
Sodium 745  
Zinc 746  
TOTAL CATIONS 99  
Sp. Cond.  $\mu$ mhos/cm. 510 782  
TDS @ 180°C 316 786  
4 CHEMICAL ANALYSIS  
mg/l ANIONS  
Bicarbonate 134 758  
Carbon Dioxide 1 759  
Carbonate 0 760  
Chloride 20 763  
CO<sub>2</sub> Solids 65 765  
Fluoride 0.31 766  
Hydroxide 0.00 767  
Nitrate as N 0.24 768  
Nitrite as N 0.01 769  
Phosphorus, Ortho as P 0.01 770  
Silica, dissolved as SiO<sub>2</sub> 1.8 771  
Sulfate 11.4 772  
TOTAL ANIONS 317  
GRAND TOTAL 316  
Tot. Phosphorus 785  
Total Alk. as CaCO<sub>3</sub> 109 786  
T. Hdns. as CaCO<sub>3</sub> 216 787  
Surfactant as MBAS 773  
Turbidity, as NTU 27 787  
Sp. Gravity 608  
5 TOTAL METALS ANALYSIS  
mg/l CATIONS ug/l (ppb)  
Aluminum 420 800  
Arsenic 12 860  
Barium 105 861  
Beryllium 801  
Cadmium 4 862  
Chromium 5 863  
Cobalt 804  
Copper 35 864  
Gold 700  
Iron 77 765  
Lead 470 865  
Manganese 175 866  
Mercury 5 739  
Molybdenum < 50 802  
Nickel < 2 867  
Selenium 2 868  
Silver < 2 869  
Uranium 601  
Vanadium 803  
Zinc 600 870

6 RADIOLOGICS  
Alpha, gross 621 89 Sr 633  
Beta, gross 623 131 I 635  
Tritium, <sup>3</sup>H 625 134 Cs 637  
226 Radium 627 137 Cs 639  
228 Radium 629  
90 Sr 631

INTERPRETATION OF ANALYSES:  
Remarks:  
Based on State Standards, this sample was:  
B.O.D.<sub>5</sub>  
Tot. Sol. Solids  
M.P.N. Total Coliform.  
M.P.N. Fecal Coliform.

Analyses Approved By: **RBO** Date: **SEP 24 85**

# TOTAL CHEM + TOTAL METALS + DISSOLVED METALS

Rev. 3/82

Field No.

CW85113

Pest.

Rad.

Bact.

Spec.

Date Recd.:

Received By:

UTAH STATE DEPARTMENT OF HEALTH

ENVIRONMENTAL HEALTH

WATER ANALYSES

SEP 24 85 854969

Sample No.

701

Store No.

Water Syst. No. Source No.

Date Collected

Time Collected

Water Rights No.

8/5/85 9:24

12:00

707

Exact Description of Sampling Point

PACIFIC BRIDGE WELL

Supply Owned by

Sample Type

Sample Collected by

SLAM/BERDON

SEND REPORT TO:

Phone

5334145

2. SALMON

42315 STATE OFFICE BLDG.

SUC UT

zip code

Sample Source

County

Current use

Proposed use

01 Spring 14 Other  
02 Well 15 Tunnel  
03 Stream 18 Artesian  
04 Lake well  
06 Dist. syst. 19 Swimming  
07 Effluent pool  
08 Storm sewer

01 Beaver 16 Plate  
02 Bear Eider 17 Rich  
03 Cache 18 Salt Lake  
04 Carbon 19 San Juan  
05 Daguerre 20 Seneca  
06 Dora 21 Sevier  
07 Duchesne 22 Summit  
08 Emery 23 Teane  
09 Garfield 24 Uintah  
10 Grand 25 Utah  
11 Iron 26 Wasatch  
12 Juab 27 Washington  
13 Kane 28 Wayne  
14 Milled 29 Weber  
15 Morgan

1. Culinary  
2. Agriculture  
3. Industrial  
4. Other

Cost Code

## 1 FIELD TESTS

Temperature (°C)

D.O., mg/l

Sp. Cond.  $\mu$ mhos

pH

Sp. Gravity

Transparency, m

CO<sub>2</sub>, mg/l

Depth, m

Cl Resid., mg/l

Flow, MGD

Flow, GPM

Flow, cfs

## 2 Temperature (°C)

650

pH

782

## WASTEWATER ANALYSIS

## BACT. LAB. No.

B.O.D.<sub>5</sub>

Tot. Sus. Solids

NO<sub>2</sub>+NO<sub>3</sub>-N

T.K.N.

Oil & Grease

mg/l

794

787

603

778

780

T.O.C.

C.O.D.

Cyanide

Phenolics

Sulfide

mg/l

671

777

775

783

672

M.P.N. Total Coliforms/100ml

M.P.N. Fecal Coliforms/100ml

Fecal Strept C/100ml

M.F. Total Coliforms/100ml

M.F. Fecal Coliforms/100ml

Plate Count-Orig./ml

## 3 Filtered

## Unfiltered

me/l CATIONS mg/l ug/l (ppb)

Ammonia as N

Arsonic

Barium

Boron

Cadmium

Calcium

Chromium

Chromium, Hex. as Cr

Copper

Iron, dissolved

Lead

Magnesium

Manganese

Nickel

Potassium

Selenium

Silver

Sodium

Zinc

TOTAL CATIONS

123

Sp. Cond.  $\mu$ mhos/cm.

TDS @ 180°C

715

358

## 4 CHEMICAL ANALYSIS

me/l ANIONS mg/l

Barbarone

Carbon Dioxide

Carbonate

Chloride

CO<sub>2</sub> Solids

Fluoride

Hydroxide

Nitrate as N

Nitrite as N

Phosphorus, Ortho as P

Silica, dissolved as SiO<sub>2</sub>

Sulfate

TOTAL ANIONS

GRAND TOTAL

Tot. Phosphorus

Total Alk. as CaCO<sub>3</sub>

T. Hdns. as CaCO<sub>3</sub>

Surfactant as MBAS

Turbidity, as NTU

Sp. Gravity

pH, units

8.0

## 5 CATIONS

mg/l ug/l (ppb)

Aluminum

Arsonic

Barium

Beryllium

Cadmium

Chromium

Cobalt

Copper

Gold

Iron

Lead

Manganese

Mercury

Molybdenum

Nickel

Selenium

Silver

Uranium

Vanadium

Zinc

## 6 RADIOLOGICS

Alpha, gross

Beta, gross

Tritium, <sup>3</sup>H

226 Radium

228 Radium

90 Sr

89 Sr

131 I

134 Cs

137 Cs

## INTERPRETATION OF ANALYSES:

Remarks:

Based on State Standards, this sample was:

B.O.D.<sub>5</sub>

Tot. Sus. Solids

M.P.N. Total Coliform.

M.P.N. Fecal Coliform.

Analyses Approved By:

RSD

Date: 851011

By

ENVIRONMENTAL HEALTH

# TOTAL CHEM + TOTAL METALS + DISSOLVED METALS

Rev. 3/82  
Field No. **CW85114**  
☒ RC ☒ TM ☐ Nut ☐ BOD  
☐ PC ☐ PM

Pest. ☐  
 Rad. ☐  
 Bact. ☐ Date Recd.: \_\_\_\_\_  
 Spec. ☐ Received By: \_\_\_\_\_

UTAH STATE DEPARTMENT OF HEALTH  
 ENVIRONMENTAL HEALTH  
 WATER ANALYSES

SEP 24 85 854870

Sample No. 701

Store No. \_\_\_\_\_  
 Water Syst. No. Source No. \_\_\_\_\_  
 Date Collected **702** Time Collected **12:05**  
 8/10/92 12:05  
 24-hour clock  
 Exact Description of sampling Point  
**SPRING AT BUTCH CASSID**  
**QUATTEADP DR.**  
 Supply Owned by \_\_\_\_\_ Sample Type \_\_\_\_\_  
 Sample Collected by **SILAM/HEBDON**  
 SEND REPORT TO: Phone **5324145**  
**J. SALMON**  
**4231 STATE OFFICE BLDG.**  
 zip code \_\_\_\_\_

Sample Source **01 Spring** 14 Other  
 02 Well 15 Tunnel  
 03 Stream 18 Artesian  
 04 Lake well  
 06 Dist. syst. 19 Swimming pool  
 07 Effluent  
 08 Storm sewer  
 County **01 Beaver** 16 Piute  
 02 Box Elder 17 Rich  
 03 Cache 18 Salt Lake  
 04 Carbon 19 San Juan  
 05 Daguerre 20 Sanpete  
 06 Davis 21 Sevier  
 07 DeChamone 22 Summit  
 08 Emery 23 Tropic  
 09 Garfield 24 Uintah  
 10 Grand 25 Utah  
 11 Iron 26 Wasatch  
 12 Juab 27 Washington  
 13 Kane 28 Wayne  
 14 Millard 29 Weber  
 15 Morgan  
 Current use \_\_\_\_\_ 708  
 Proposed use \_\_\_\_\_ 709  
 1. Culinary  
 2. Agriculture  
 3. Industrial  
 4. Other  
 Cost Code \_\_\_\_\_ 770

2 Temperature (°C) \_\_\_\_\_ 650 pH \_\_\_\_\_ 782  
 WASTEWATER ANALYSIS  
 BACT. LAB. No. \_\_\_\_\_  
 mg/l  
 B.O.D.<sub>5</sub> \_\_\_\_\_ 784  
 Tot. Sus. Solids **3** \_\_\_\_\_ 787  
 NO<sub>2</sub>+NO<sub>3</sub>-N \_\_\_\_\_ 603  
 T.K.N. \_\_\_\_\_ 778  
 Oil & Grease \_\_\_\_\_ 780  
 mg/l  
 T.O.C. \_\_\_\_\_ 671  
 C.O.D. \_\_\_\_\_ 777  
 Cyanide \_\_\_\_\_ 776  
 Phenolics \_\_\_\_\_ 783  
 Sulfide \_\_\_\_\_ 672  
 M.P.N. Total Coliforms/100ml \_\_\_\_\_ 658  
 M.P.N. Fecal Coliforms/100ml \_\_\_\_\_ 657  
 Fecal Strep C/100ml \_\_\_\_\_ 656  
 M.F. Total Coliforms/100ml \_\_\_\_\_ 654  
 M.F. Fecal Coliforms/100ml \_\_\_\_\_ 655  
 Plate Count-Orig./ml \_\_\_\_\_ 659

3 Filtered \_\_\_\_\_ Unfiltered \_\_\_\_\_  
 me/l  
 CATIONS mg/l ug/l (ppb)  
 Ammonia as N **16.3** \_\_\_\_\_ 722  
 Arsenic \_\_\_\_\_ 723  
 Barium \_\_\_\_\_ 724  
 Boron \_\_\_\_\_ 725  
 Cadmium \_\_\_\_\_ 727  
 Calcium **326** \_\_\_\_\_ 728  
 Chromium \_\_\_\_\_ 729  
 Chromium, Hex. as Cr \_\_\_\_\_ 730  
 Copper \_\_\_\_\_ 732  
 Iron, dissolved **3.8** \_\_\_\_\_ 733  
 Lead **15** \_\_\_\_\_ 734  
 Magnesium **46** \_\_\_\_\_ 737  
 Manganese \_\_\_\_\_ 738  
 Nickel \_\_\_\_\_ 740  
 Potassium **6** \_\_\_\_\_ 742  
 Selenium \_\_\_\_\_ 743  
 Silver \_\_\_\_\_ 744  
 Sodium **335** \_\_\_\_\_ 745  
 Zinc **22.5** \_\_\_\_\_ 749  
 TOTAL CATIONS **432**  
 Sp. Cond.  $\mu$ mhos/cm. **1765** 763  
 TDS @ 180°C **1394** 766  
 4 CHEMICAL ANALYSIS  
 me/l ANIONS mg/l  
 Bicarbonate **100** 758  
 Carbon Dioxide **31** 759  
 Carbonate **0** 760  
 Chloride **120** 763  
 CO<sub>2</sub> Solids **49** 765  
 Fluoride **0.06** 767  
 Hydroxide **0.00** 767  
 Nitrate as N **0.60** 605  
 Nitrite as N **0.01** 606  
 Phosphorus, Ortho as P **0.01** 607  
 Silica, dissolved as SiO<sub>2</sub> **15** 760  
 Sulfate **800** 772  
 TOTAL ANIONS **984**  
 GRAND TOTAL **1416**  
 Tot. Phosphorus \_\_\_\_\_ 785  
 Total Alk. as CaCO<sub>3</sub> **82** 752  
 T. Hons. as CaCO<sub>3</sub> **1004** 754  
 Surfactant as MBAS \_\_\_\_\_ 773  
 Turbidity, as NTU **0.8** 757  
 Sp. Gravity \_\_\_\_\_ 608  
 pH, units **6.7**  
 5 TOTAL METALS ANALYSIS  
 mg/l ug/l (ppb)  
 CATIONS  
 Aluminum **146** 800  
 Arsenic **5** 660  
 Barium \_\_\_\_\_ 661  
 Beryllium \_\_\_\_\_ 801  
 Cadmium **25** 662  
 Chromium **5** 663  
 Cobalt \_\_\_\_\_ 804  
 Copper **10** 664  
 Gold \_\_\_\_\_ 700  
 Iron **104** 755  
 Lead **5** 665  
 Manganese **485** 666  
 Mercury **1** 739  
 Molybdenum **50** 802  
 Nickel **5** 667  
 Selenium **5** 668  
 Silver **2** 669  
 Uranium \_\_\_\_\_ 601  
 Vanadium \_\_\_\_\_ 803  
 Zinc **4200** 670

6 RADIOLOGICS  
 Alpha, gross \_\_\_\_\_ 631  
 Beta, gross \_\_\_\_\_ 633  
 Tritium, <sup>3</sup>H \_\_\_\_\_ 635  
 226 Radium \_\_\_\_\_ 637  
 228 Radium \_\_\_\_\_ 639  
 90Sr \_\_\_\_\_  
 89Sr \_\_\_\_\_  
 131I \_\_\_\_\_  
 134Cs \_\_\_\_\_  
 137Cs \_\_\_\_\_  
 Analyses Approved By: **RED** Date: **851011**

INTERPRETATION OF ANALYSES:  
 Remarks:  
 Based on State Standards, this sample was:  
 B.O.D.<sub>5</sub> \_\_\_\_\_  
 Tot. Sus. Solids \_\_\_\_\_  
 M.P.N. Total Coliform \_\_\_\_\_  
 M.P.N. Fecal Coliform \_\_\_\_\_  
 By: \_\_\_\_\_

## TOTAL CHEM + TOTAL METALS + DISSOLVED METALS

Rev. 3/82

Field No.

XC

PC

68515

TM

PM

Nut

BOD

Pest.

Rad.

Bact.

Spec.

Date Recd.: \_\_\_\_\_

Received By: \_\_\_\_\_

UTAH STATE DEPARTMENT OF HEALTH

ENVIRONMENTAL HEALTH

WATER ANALYSES

SEP 24 85 854972

Sample No.

701

Storet No.

702

Water Syst. No. Source No.

703 704

Date Collected

702

Time Collected

714

Water Rights No.

707

Yr. Mo. Dy.

24-hour clock

Exact Description of sampling Point

SILVER CREEK

BLANK

646

Supply Owned by

712

Sample Type

710

Sample Collected by

SLAM / HERBON

713

SEND REPORT TO:

Phone

715

648

717

Zip code

Sample Source

719

01 Spring

02 Well

03 Stream

04 Lake

06 Dist. syst.

07 Effluent

08 Storm

sewer

14 Other

15 Tunnel

18 Artesian

well

19 Swimming

pool

County

611

01 Beaver

02 Ben Eider

03 Cache

04 Carbon

05 Daggett

06 Davis

07 Duchesne

08 Emery

09 Garfield

10 Grand

11 Iron

12 Juab

13 Kane

14 Millard

15 Morgan

16 Piute

17 Rich

18 Salt Lake

19 San Juan

20 Sanpete

21 Sevier

22 Summit

23 Teasdale

24 Uintah

25 Utah

26 Wasatch

27 Washington

28 Wayne

29 Weber

Current use

708

Proposed use

709

1. Culinary
2. Agriculture
3. Industrial
4. Other

Cost Code

770

1

FIELD TESTS

Temperature (°C)

702

D.O., mg/l

703

Sp. Cond.  $\mu$ mhos

653

pH

651

Sp. Gravity

608

Transparency, m

649

CO<sub>2</sub>, mg/l

572

Depth, m

609

Cl Resid., mg/l

753

Flow, MGD

652

Flow, GPM

604

Flow, cfs

659

2 Temperature (°C)

650

pH

783

WASTEWATER ANALYSIS

BACT. LAB. No.

B.O.D.<sub>5</sub>

Tot. Sus. Solids

NO<sub>2</sub>+NO<sub>3</sub>-N

T.K.N.

Oil &amp; Grease

mg/l

784

787

602

778

780

T.O.C.

C.O.D.

Cyanide

Phenolics

Sulfide

mg/l

671

777

775

783

672

M.P.N. Total Coliforms/100ml

M.P.N. Fecal Coliforms/100ml

Fecal Strept C/100ml.

M.F. Total Coliforms/100ml.

M.F. Fecal Coliforms/100ml.

Plate Count-Org./ml.

658

657

656

654

655

599

3

Filtered

Unfiltered

mg/l

CATIONS

mg/l

ug/l (ppb)

Ammonia as N

722

Arsenic

723

Barium

724

Boron

725

Cadmium

727

Calcium

728

Chromium

729

Chromium, Hex. as Cr

730

Copper

732

Iron, dissolved

733

Lead

734

Magnesium

737

Manganese

738

Nickel

740

Potassium

742

Selenium

743

Silver

744

Sodium

745

Zinc

749

TOTAL CATIONS

Sp. Cond.  $\mu$ mhos/cm.

782

TDS @ 180°C

786

4 CHEMICAL ANALYSIS

mg/l

ANIONS

mg/l

Bicarbonate

758

Carbon Dioxide

759

Carbonate

760

Chloride

763

CO<sub>2</sub> Solids

765

Fluoride

767

Hydroxide

605

Nitrate as N

606

Nitrite as N

607

Phosphorus, Ortho as P

750

Silica, dissolved as SiO<sub>2</sub>

772

Sulfate

773

TOTAL ANIONS

GRAND TOTAL

Tot. Phosphorus

785

Total Alk. as CaCO<sub>3</sub>

783

T. Hds. as CaCO<sub>3</sub>

784

Surfactant as MBAS

773

Turbidity, as NTU

787

Sp. Gravity

608

pH, units

6.0

5 TOTAL METALS ANALYSIS

mg/l

ug/l (ppb)

Aluminum

590

Arsenic

660

Barium

661

Beryllium

601

Cadmium

662

Chromium

663

Cobalt

604

Copper

664

Gold

700

Iron

785

Lead

665

Manganese

666

Mercury

739

Molybdenum

602

Nickel

667

Selenium

668

Silver

669

Uranium

601

Vanadium

603

Zinc

670

6

RADIOLOGICS

BQ/g

BQ/g

Alpha, gross

621

Beta, gross

623

Tritium, <sup>3</sup>H

625

226 Radium

627

228 Radium

629

90Sr

631

89Sr

131I

134Cs

137Cs

633

635

637

639

INTERPRETATION OF ANALYSES:

Remarks:

Based on State Standards,

this sample was:

B.O.D.<sub>5</sub>

Tot. Sus. Solids

M.P.N. Total Coliform.

M.P.N. Fecal Coliform.

Residuary

Compliance

Un satisfactory

Analyses Approved By:

RED

Date: 851011

By:

ENVIRONMENTAL HEALTH

HW-5 6/85

UTAH STATE HEALTH LABORATORY  
44 Medical Dr. SLC, Utah 84113 (801) 533-6131

## ENVIRONMENTAL CHEMISTRY

## TOTAL METALS AND OTHER ANALYSES

LAB NUMBER 85854958Field No. CW85107A☐ Known Hazardous Waste☒ Unknown MaterialDate Collected 85 09 24 Time Collected 0945 County SUMMITSample collected by SLAM / HEDDON Sample Type \_\_\_\_\_Facility from which sample was collected SILVER CREEKExact description of sampling point @ WEST OF CITY BLDG

Field tests \_\_\_\_\_

Send report to Jim Salmon Bureau of Hazardous Waste Telephone No. 533-4145Address 4231 State Office Bldg. S.L.C., Utah Zip Code 84144

Date and time received by Lab. \_\_\_\_\_ Received by \_\_\_\_\_

## OTHER ANALYSES

☐ Oil and Grease \_\_\_\_\_ PPM

☐ T.K.N. \_\_\_\_\_ PPM

☐ Reactive HCN \_\_\_\_\_ PPM

☐ Reactive H<sub>2</sub>S \_\_\_\_\_ PPM

☐ pH \_\_\_\_\_

☐ Solids 77.6 %

☐ \_\_\_\_\_

☐ \_\_\_\_\_

☐ \_\_\_\_\_

☐ \_\_\_\_\_

☐ \_\_\_\_\_

## TOTAL METALS

check one of the following

☐ 8 Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)

☐ or 12 Metals (The 8 above + Cu, Fe, Mn, Zn)

☐ or all 18 Metals listed below

☐ or only those Metals checked below

\*\*\*\*\*

* <input checked="" type="checkbox"/> Aluminum	<u>9300.</u> PPM
* <input checked="" type="checkbox"/> Arsenic	<u>104.</u> PPM
* <input checked="" type="checkbox"/> Barium	<u>&lt;12.</u> PPM
* <input type="checkbox"/> Beryllium	_____ PPM
* <input checked="" type="checkbox"/> Cadmium	<u>31.4</u> PPM
* <input checked="" type="checkbox"/> Chromium	<u>64.8</u> PPM
* <input type="checkbox"/> Cobalt	_____ PPM
* <input checked="" type="checkbox"/> Copper	<u>234.</u> PPM
* <input checked="" type="checkbox"/> Iron	<u>26,000.</u> PPM
* <input checked="" type="checkbox"/> Lead	<u>700.</u> PPM
* <input checked="" type="checkbox"/> Manganese	<u>1760.</u> PPM
* <input checked="" type="checkbox"/> Mercury	<u>.93</u> PPM
* <input checked="" type="checkbox"/> Molybdenum	<u>10.0</u> PPM
* <input checked="" type="checkbox"/> Nickel	<u>17.8</u> PPM
* <input checked="" type="checkbox"/> Selenium	<u>2.2</u> PPM
* <input checked="" type="checkbox"/> Silver	<u>3.77</u> PPM
* <input type="checkbox"/> Vanadium	_____ PPM
* <input checked="" type="checkbox"/> Zinc	<u>7.22</u> PPM
* <input type="checkbox"/> _____	_____ PPM

\*\*\*\*\*

Results are: ☒ Dry weight basis, ☐ Wet weight basisPreparation and analyses performed by Doyle Gregory Jenkins

HW-5 6/85

UTAH STATE HEALTH LABORATORY  
44 Medical Dr. SLC, Utah 84113 (801) 533-6131

SEP 24 85 854960

ENVIRONMENTAL CHEMISTRY

TOTAL METALS AND OTHER ANALYSES

LAB NUMBER

Field No. CW85108 A ☐ Known Hazardous Waste ☒ Unknown MaterialDate Collected 85 09 24 Time Collected 1000 County SUMMITSample collected by SLAM / HEDDON Sample Type 24 hr clockFacility from which sample was collected POISON CREEK EAST OFExact description of sampling point UTAH COAL & LUMBER

Field tests

Send report to Jim Salmon Bureau of Hazardous Waste Telephone No. 533-4145Address 4231 State Office Bldg. S.L.C., Utah Zip Code 84144

Date and time received by Lab. Received by

## OTHER ANALYSES

☐ Oil and Grease

PPM

☐ T.K.N.

PPM

☐ Reactive HCN

PPM

☐ Reactive H<sub>2</sub>S

PPM

☐ pH☐ Solids77.7 %☐☐☐☐☐☐

\*

\*

\*

## TOTAL METALS

check one of the following

☐ 8 Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)☐ or 12 Metals (The 8 above + Cu, Fe, Mn, Zn)☐ or all 18 Metals listed below☐ or only those Metals checked below

\*\*\*\*\*

\* ☒ Aluminum 7600. PPM\* ☒ Arsenic 88. PPM\* ☒ Barium <12. PPM\* ☐ Beryllium PPM\* ☒ Cadmium 45.8 PPM\* ☒ Chromium 88. PPM\* ☐ Cobalt PPM\* ☒ Copper 302. PPM\* ☒ Iron 44,000. PPM\* ☒ Lead 800. PPM\* ☒ Manganese 2400. PPM\* ☒ Mercury 1.4 PPM\* ☒ Molybdenum 22. PPM\* ☒ Nickel 17. PPM\* ☒ Selenium 4.6 PPM\* ☒ Silver 5.4 PPM\* ☐ Vanadium PPM\* ☒ Zinc 7.92 PPM\* ☐ PPM

\*

Results are: ☒ Dry weight basis, ☐ Wet weight basisPreparation and analyses performed by Doyl Gregory JenkinsAnalysis Certified By 1/10/86Date 11 Oct 85

HW-5 6/85

UTAH STATE HEALTH LABORATORY  
44 Medical Dr. SLC, Utah 84113 (801) 533-6131

ENVIRONMENTAL CHEMISTRY TOTAL METALS AND OTHER ANALYSES LAB NUMBER SEP 24 85 85496

Field No. CW85109 A ☐ Known Hazardous Waste ☒ Unknown Material

Date Collected 85 09 24 Time Collected 1020 County SUMMIT  
year/month/day 24 hr. clock

Sample collected by SLAM / HEBDON Sample Type \_\_\_\_\_

Facility from which sample was collected \_\_\_\_\_

Exact description of sampling point \_\_\_\_\_

Field tests \_\_\_\_\_

Send report to Jim Salmon Bureau of Hazardous Waste Telephone No. 533-4145

Address 4231 State Office Bldg. S.L.C., Utah Zip Code 84144

Date and time received by Lab. \_\_\_\_\_ Received by \_\_\_\_\_

\*\*\*\*\*

OTHER ANALYSES

☐ Oil and Grease \_\_\_\_\_ PPM  
☐ T.K.N. \_\_\_\_\_ PPM  
☐ Reactive HCN \_\_\_\_\_ PPM  
☐ Reactive H<sub>2</sub>S \_\_\_\_\_ PPM  
☐ pH \_\_\_\_\_  
☐ Solids 74.9 %  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_

TOTAL METALS

check one of the following  
☐ 8 Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)

☐ or 12 Metals (The 8 above + Cu, Fe, Mn, Zn)

☐ or all 18 Metals listed below

☐ or only those Metals checked below

\*\*\*\*\*  
\* ☒ Aluminum 10,400 PPM  
\* ☒ Arsenic 73 PPM  
\* ☒ Barium <25 PPM  
\* ☒ Beryllium \_\_\_\_\_ PPM  
\* ☒ Cadmium 27.7 PPM  
\* ☒ Chromium 48 PPM  
\* ☐ Cobalt \_\_\_\_\_ PPM  
\* ☒ Copper 232 PPM  
\* ☒ Iron 23,000 PPM  
\* ☒ Lead 1300 PPM  
\* ☒ Manganese 2100 PPM  
\* ☒ Mercury 3.1 PPM  
\* ☒ Molybdenum 8.7 PPM  
\* ☒ Nickel 19 PPM  
\* ☒ Selenium 2.4 PPM  
\* ☒ Silver 10.1 PPM  
\* ☐ Vanadium \_\_\_\_\_ PPM  
\* ☒ Zinc 4.49 PPM  
\* ☐ \_\_\_\_\_ PPM  
\*\*\*\*\*

Results are: ☒ Dry weight basis, ☐ Wet weight basis

Preparation and analyses performed by Doyle Gregory Jenkins

Analysis Certified By \_\_\_\_\_

HW-5 6/85

UTAH STATE HEALTH LABORATORY  
44 Medical Dr. SLC, Utah 84113 (801) 533-6131

ENVIRONMENTAL CHEMISTRY

TOTAL METALS AND OTHER ANALYSES

LAB NUMBER 85854864

Field No. CW 85110 A ☐ Known Hazardous Waste ☐ Unknown Material

Date Collected 85 07 24 Time Collected 1030 County SUMMIT  
year/month/day 24 hr. clock

Sample collected by SLAM / HEDON Sample Type \_\_\_\_\_

Facility from which sample was collected SILVER CREEK AT RAILROAD

Exact description of sampling point CROSSING AT PROSPECTOR SQUARE

Field tests \_\_\_\_\_

Send report to Jim Salmon Bureau of Hazardous Waste Telephone No. 533-4145

Address 4231 State Office Bldg. S.L.C., Utah Zip Code 84144

Date and time received by Lab. \_\_\_\_\_ Received by \_\_\_\_\_

OTHER ANALYSES

☐ Oil and Grease \_\_\_\_\_ PPM  
☐ T.K.N. \_\_\_\_\_ PPM  
☐ Reactive HCN \_\_\_\_\_ PPM  
☐ Reactive H<sub>2</sub>S \_\_\_\_\_ PPM  
☐ pH \_\_\_\_\_  
☐ Solids 74.2 %  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_

TOTAL METALS

check one of the following  
☐ 8 Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)

☐ or 12 Metals (The 8 above + Cu, Fe, Mn, Zn)

☐ or all 18 Metals listed below

☐ or only those Metals checked below

\*\*\*\*\*  
\* ☒ Aluminum 11,000. PPM  
\* ☒ Arsenic 48. PPM  
\* ☒ Barium 23. PPM  
\* ☐ Beryllium \_\_\_\_\_ PPM  
\* ☒ Cadmium 22.2 PPM  
\* ☒ Chromium 38. PPM  
\* ☐ Cobalt \_\_\_\_\_ PPM  
\* ☒ Copper 205. PPM  
\* ☒ Iron 20,000. PPM  
\* ☒ Lead 1400. PPM  
\* ☒ Manganese 2100. PPM  
\* ☒ Mercury 2.2 PPM  
\* ☒ Molybdenum 4.9 PPM  
\* ☒ Nickel 18. PPM  
\* ☒ Selenium 1.4 PPM  
\* ☒ Silver 3.1 PPM  
\* ☐ Vanadium \_\_\_\_\_ PPM  
\* ☒ Zinc 4.21 PPM  
\* ☐ \_\_\_\_\_ PPM  
\*\*\*\*\*

Results are: ☒ Dry weight basis, ☐ Wet weight basis

Preparation and analyses performed by Doyle Gregory Jenkins

Analysis Certified By \_\_\_\_\_

HW-5 6/85

UTAH STATE HEALTH LABORATORY  
44 Medical Dr. SLC, Utah 84113 (801) 533-6131

ENVIRONMENTAL CHEMISTRY TOTAL METALS AND OTHER ANALYSES LAB NUMBER 85854986  
Field No. CW 85111 A ☐ Known Hazardous Waste ☒ Unknown Material  
Date Collected 85 09 24 Time Collected 1045 County SUMMIT  
Sample collected by SILVER CREEK Sample Type SLAM  
Facility from which sample was collected SILVER CREEK ON SITE  
Exact description of sampling point N. OF RR TRACK @ OFFICE BLDG

Field tests \_\_\_\_\_

Send report to Jim Salmon Bureau of Hazardous Waste Telephone No. 533-4145  
Address 4231 State Office Bldg. S.L.C., Utah Zip Code 84144  
Date and time received by Lab. \_\_\_\_\_ Received by \_\_\_\_\_

\*\*\*\*\*

OTHER ANALYSES		TOTAL METALS	
		check one of the following	
<input type="checkbox"/> Oil and Grease	_____ PPM	<input type="checkbox"/> 8 Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)	
<input type="checkbox"/> T.K.N.	_____ PPM	<input type="checkbox"/> or 12 Metals (The 8 above + Cu, Fe, Mn, Zn)	
<input type="checkbox"/> Reactive HCN	_____ PPM	<input type="checkbox"/> or all 18 Metals listed below	
<input type="checkbox"/> Reactive H <sub>2</sub> S	_____ PPM	<input type="checkbox"/> or only those Metals checked below	
<input type="checkbox"/> pH	_____	*****	
<input type="checkbox"/> Solids	<u>73.9</u> %	<input checked="" type="checkbox"/> Aluminum	<u>8300.</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Arsenic	<u>270.</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Barium	<u>&lt;12.</u> PPM
<input type="checkbox"/> _____	_____	<input type="checkbox"/> Beryllium	_____ PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Cadmium	<u>25.4</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Chromium	<u>59.</u> PPM
<input type="checkbox"/> _____	_____	<input type="checkbox"/> Cobalt	_____ PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Copper	<u>508.</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Iron	<u>57,000.</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Lead	<u>800.</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Manganese	<u>770.</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Mercury	<u>2.3</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Molybdenum	<u>9.3</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Nickel	<u>14.</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Selenium	<u>5.9</u> PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Silver	<u>3.66</u> PPM
<input type="checkbox"/> _____	_____	<input type="checkbox"/> Vanadium	_____ PPM
<input type="checkbox"/> _____	_____	<input checked="" type="checkbox"/> Zinc	<u>4.29</u> PPM
<input type="checkbox"/> _____	_____	<input type="checkbox"/> _____	_____ PPM

\*\*\*\*\*

Results are: ☒ Dry weight basis, ☐ Wet weight basis

Preparation and analyses performed by Doyle Gregory Jenkins

## ENVIRONMENTAL CHEMISTRY

## TOTAL METALS AND OTHER ANALYSES

LAB NUMBER 8485854968Field No. CW 851124 ☐ Known Hazardous Waste ☒ Unknown MaterialDate Collected 8C 09 24 Time Collected 1100 County SUMMIT  
year/month/day 24 hr. clockSample collected by SLAM / HERDON Sample Type \_\_\_\_\_Facility from which sample was collected SILVER CREEK @ WYATT EARExact description of sampling point 8 SIDEWINDER

Field tests \_\_\_\_\_

Send report to Jim Salmon Bureau of Hazardous Waste Telephone No. 533-4145Address 4231 State Office Bldg. S.L.C., Utah Zip Code 84144

Date and time received by Lab. \_\_\_\_\_ Received by \_\_\_\_\_

## OTHER ANALYSES

☐ Oil and Grease \_\_\_\_\_ PPM  
☐ T.K.N. \_\_\_\_\_ PPM  
☐ Reactive HCN \_\_\_\_\_ PPM  
☐ Reactive H<sub>2</sub>S \_\_\_\_\_ PPM  
☐ pH \_\_\_\_\_  
☐ Solids 77.1 %  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_

## TOTAL METALS

check one of the following

☐ 8 Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)  
☐ or 12 Metals (The 8 above + Cu, Fe, Mn, Zn)  
☐ or all 18 Metals listed below  
☐ or only those Metals checked below

\*\*\*\*\*  
\* ☒ Aluminum 10,300 PPM  
\* ☒ Arsenic 63 PPM  
\* ☒ Barium 50 PPM  
\* ☐ Beryllium \_\_\_\_\_ PPM  
\* ☒ Cadmium 29.4 PPM  
\* ☒ Chromium 36 PPM  
\* ☐ Cobalt \_\_\_\_\_ PPM  
\* ☒ Copper 192 PPM  
\* ☐ Iron 18,000 PPM  
\* ☒ Lead 1100 PPM  
\* ☒ Manganese 1800 PPM  
\* ☒ Mercury 1.9 PPM  
\* ☒ Molybdenum 7.8 PPM  
\* ☒ Nickel 15 PPM  
\* ☒ Selenium 1.6 PPM  
\* ☒ Silver 6.98 PPM  
\* ☐ Vanadium \_\_\_\_\_ PPM  
\* ☒ Zinc 4.57 PPM  
\* ☐ \_\_\_\_\_ PPM  
\*\*\*\*\*

Results are: ☒ Dry weight basis, ☐ Wet weight basisPreparation and analyses performed by Doyle Gregory Jenkins

ENVIRONMENTAL CHEMISTRY TOTAL METALS AND OTHER ANALYSES LAB NUMBER 2485854871

Field No. CW85114A ☐ Known Hazardous Waste ☒ Unknown Material

Date Collected 85 09 24 Time Collected 1205 County SUMMIT  
year/month/day 24 hr. clock

Sample collected by SLAM / HEBDON Sample Type \_\_\_\_\_

Facility from which sample was collected SPRING @ BUTCH CASSIDY AND

Exact description of sampling point WYATT EARD. DRIVE

Field tests \_\_\_\_\_

Send report to Jim Salmon Bureau of Hazardous Waste Telephone No. 533-4145

Address 4231 State Office Bldg. S.L.C., Utah Zip Code 84144

Date and time received by Lab. \_\_\_\_\_ Received by \_\_\_\_\_

OTHER ANALYSES

☐ Oil and Grease \_\_\_\_\_ PPM  
☐ T.K.N. \_\_\_\_\_ PPM  
☐ Reactive HCN \_\_\_\_\_ PPM  
☐ Reactive H<sub>2</sub>S \_\_\_\_\_ PPM  
☐ pH \_\_\_\_\_  
☐ Solids 77.1 %  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_

TOTAL METALS

check one of the following

☐ 8 Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)  
☐ or 12 Metals (The 8 above + Cu, Fe, Mn, Zn)  
☐ or all 18 Metals listed below  
☐ or only those Metals checked below

* <input checked="" type="checkbox"/> Aluminum	17,000.	PPM
* <input checked="" type="checkbox"/> Arsenic	74.	PPM
* <input checked="" type="checkbox"/> Barium	<18.	PPM
* <input type="checkbox"/> Beryllium		PPM
* <input checked="" type="checkbox"/> Cadmium	31.0	PPM
* <input checked="" type="checkbox"/> Chromium	40.	PPM
* <input type="checkbox"/> Cobalt		PPM
* <input checked="" type="checkbox"/> Copper	243.	PPM
* <input checked="" type="checkbox"/> Iron	34,000.	PPM
* <input checked="" type="checkbox"/> Lead	1200.	PPM
* <input checked="" type="checkbox"/> Manganese	400.	PPM
* <input checked="" type="checkbox"/> Mercury	3.2	PPM
* <input checked="" type="checkbox"/> Molybdenum	4.3	PPM
* <input checked="" type="checkbox"/> Nickel	15.	PPM
* <input checked="" type="checkbox"/> Selenium	4.4	PPM
* <input checked="" type="checkbox"/> Silver	16.9	PPM
* <input type="checkbox"/> Vanadium		PPM
* <input checked="" type="checkbox"/> Zinc	4.3	PPM
* <input type="checkbox"/> _____		PPM

Results are: ☒ Dry weight basis, ☐ Wet weight basis

Preparation and analyses performed by Doyle Gregory Jenkins

Analysis Certified By 1/10 Date 11 Oct 85

HW-5 6/85

UTAH STATE HEALTH LABORATORY  
44 Medical Dr. SLC, Utah 84113 (801) 533-6131

ENVIRONMENTAL CHEMISTRY

TOTAL METALS AND OTHER ANALYSES

LAB NUMBER

Field No. 685115☐ Known Hazardous Waste☒ Unknown Material

SEP 24 1985 854972

Date Collected 85 09 24  
year/month/dayTime Collected 0900  
24 hr. clockCounty SUMMIT

Sample collected by \_\_\_\_\_

Sample Type \_\_\_\_\_

Facility from which sample was collected BLANK - SILVER CREEKExact description of sampling point BLANK

Field tests \_\_\_\_\_

Send report to Jim Salmon Bureau of Hazardous Waste Telephone No. 533-4145Address 4231 State Office Bldg. S.L.C., Utah Zip Code 84144

Date and time received by Lab. \_\_\_\_\_ Received by \_\_\_\_\_

## OTHER ANALYSES

☐ Oil and Grease \_\_\_\_\_ PPM

☐ T.K.N. \_\_\_\_\_ PPM

☐ Reactive HCN \_\_\_\_\_ PPM

☐ Reactive H<sub>2</sub>S \_\_\_\_\_ PPM

☐ pH \_\_\_\_\_

☐ Solids \_\_\_\_\_ %

☐ \_\_\_\_\_

☐ \_\_\_\_\_

☐ \_\_\_\_\_

☐ \_\_\_\_\_

☐ \_\_\_\_\_

## TOTAL METALS

check one of the following

☐ 8 Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)

☐ or 12 Metals (The 8 above + Cu, Fe, Mn, Zn)

☐ or all 18 Metals listed below

☐ or only those Metals checked below

\*\*\*\*\*

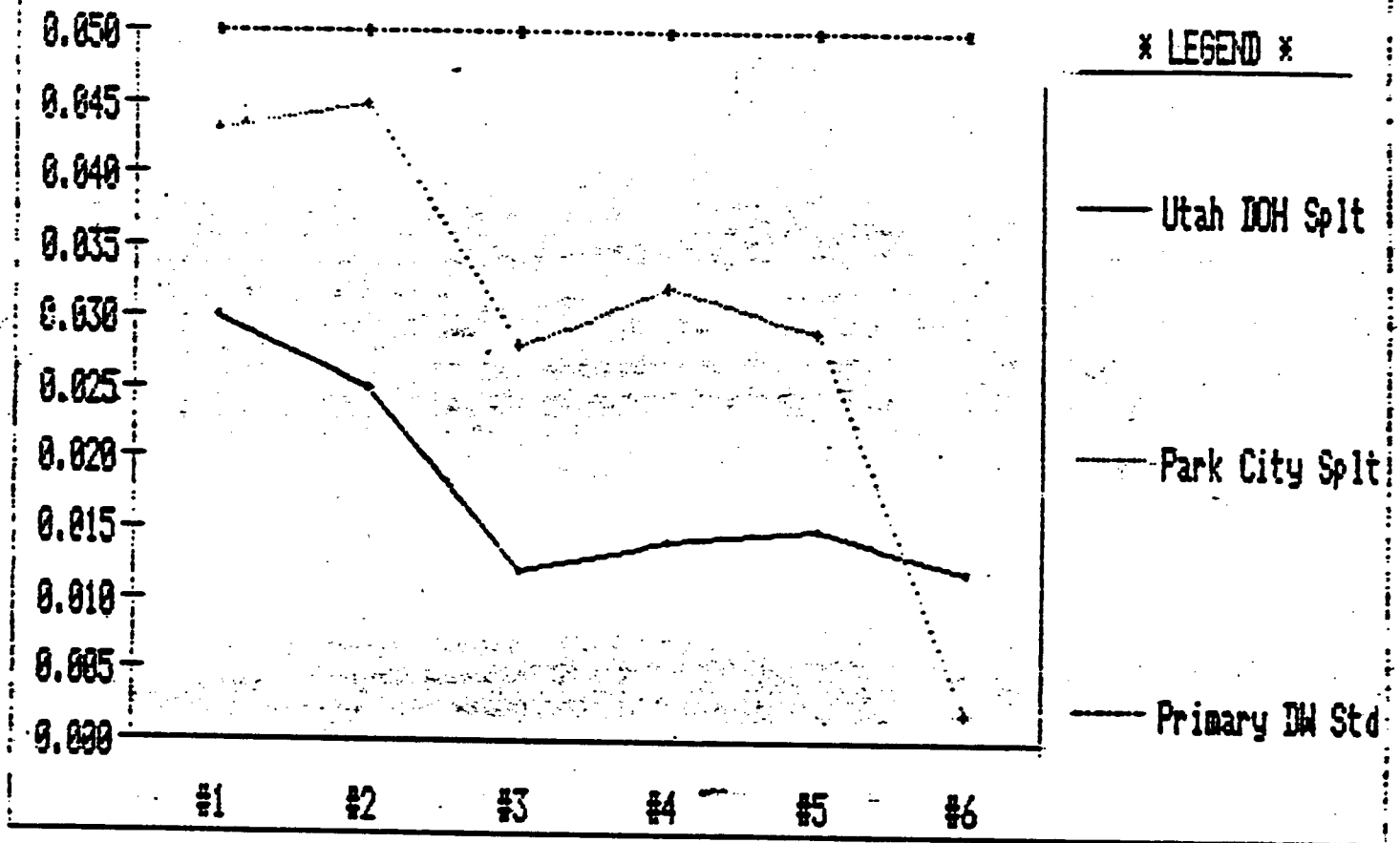
* <input checked="" type="checkbox"/> Aluminum	<u>&lt;.9</u>	PPM
* <input checked="" type="checkbox"/> Arsenic	<u>&lt;.005</u>	PPM
* <input checked="" type="checkbox"/> Barium	<u>&lt;.5</u>	PPM
* <input type="checkbox"/> Beryllium		PPM
* <input checked="" type="checkbox"/> Cadmium	<u>&lt;.05</u>	PPM
* <input checked="" type="checkbox"/> Chromium	<u>&lt;.3</u>	PPM
* <input type="checkbox"/> Cobalt		PPM
* <input checked="" type="checkbox"/> Copper	<u>&lt;.3</u>	PPM
* <input checked="" type="checkbox"/> Iron	<u>0.3</u>	PPM
* <input checked="" type="checkbox"/> Lead	<u>&lt;.5</u>	PPM
* <input checked="" type="checkbox"/> Manganese	<u>&lt;.3</u>	PPM
* <input checked="" type="checkbox"/> Mercury	<u>&lt;.0002</u>	PPM
* <input checked="" type="checkbox"/> Molybdenum	<u>&lt;.3</u>	PPM
* <input checked="" type="checkbox"/> Nickel	<u>&lt;.7</u>	PPM
* <input checked="" type="checkbox"/> Selenium	<u>&lt;.005</u>	PPM
* <input checked="" type="checkbox"/> Silver	<u>&lt;.05</u>	PPM
* <input type="checkbox"/> Vanadium		PPM
* <input checked="" type="checkbox"/> Zinc	<u>&lt;.2</u>	PPM
* <input type="checkbox"/> _____		PPM

Results are: ☐ Dry weight basis, ☒ Wet weight basisPreparation and analyses performed by Doyle Gregory JenkinsAnalysis Certified By William P. JonesDate 11 Oct 85

## APPENDIX D

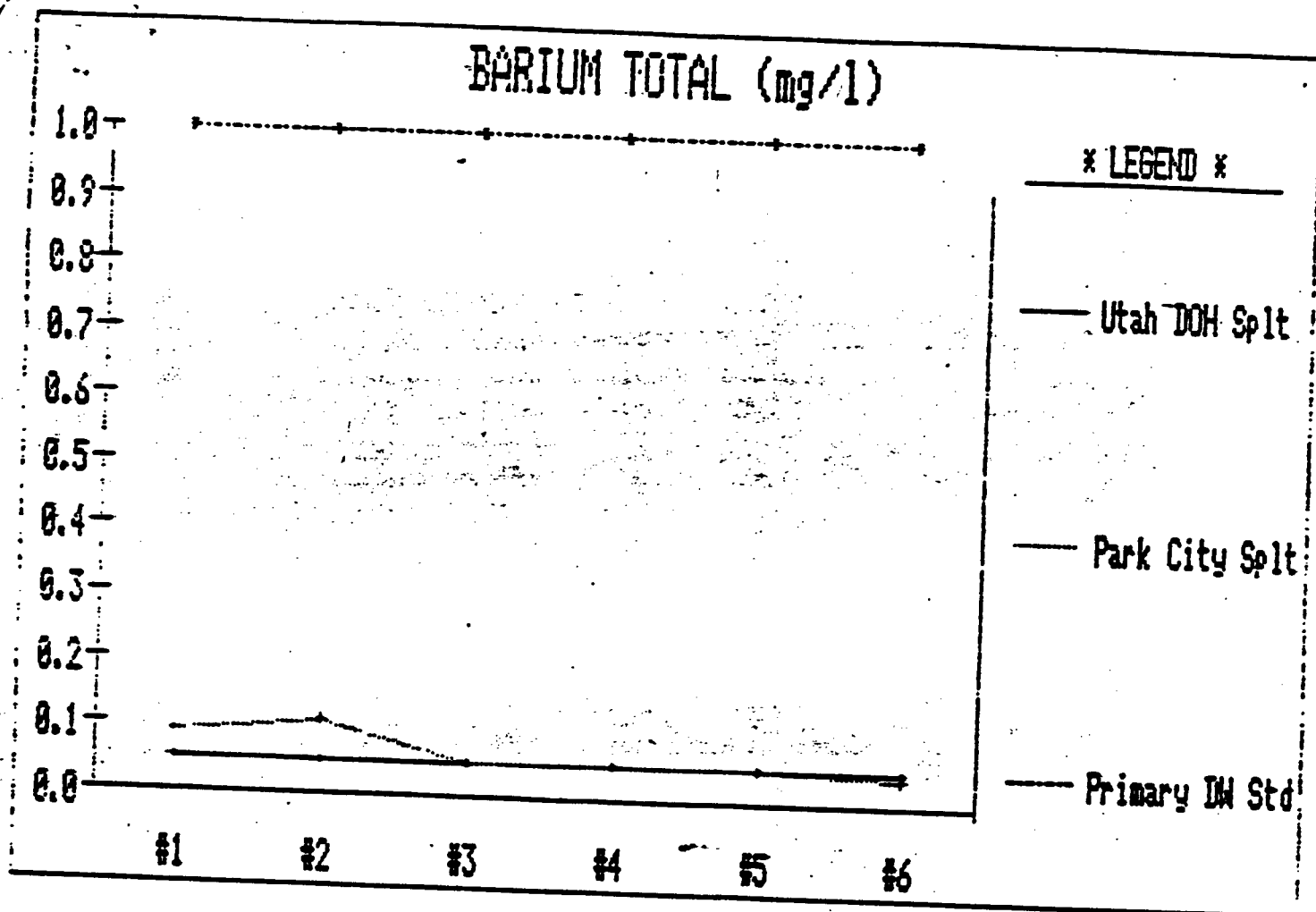
(GRAPHS FOR WATER QUALITY DATA)

# ARSENIC TOTAL (mg/l)



## WATER QUALITY DATA

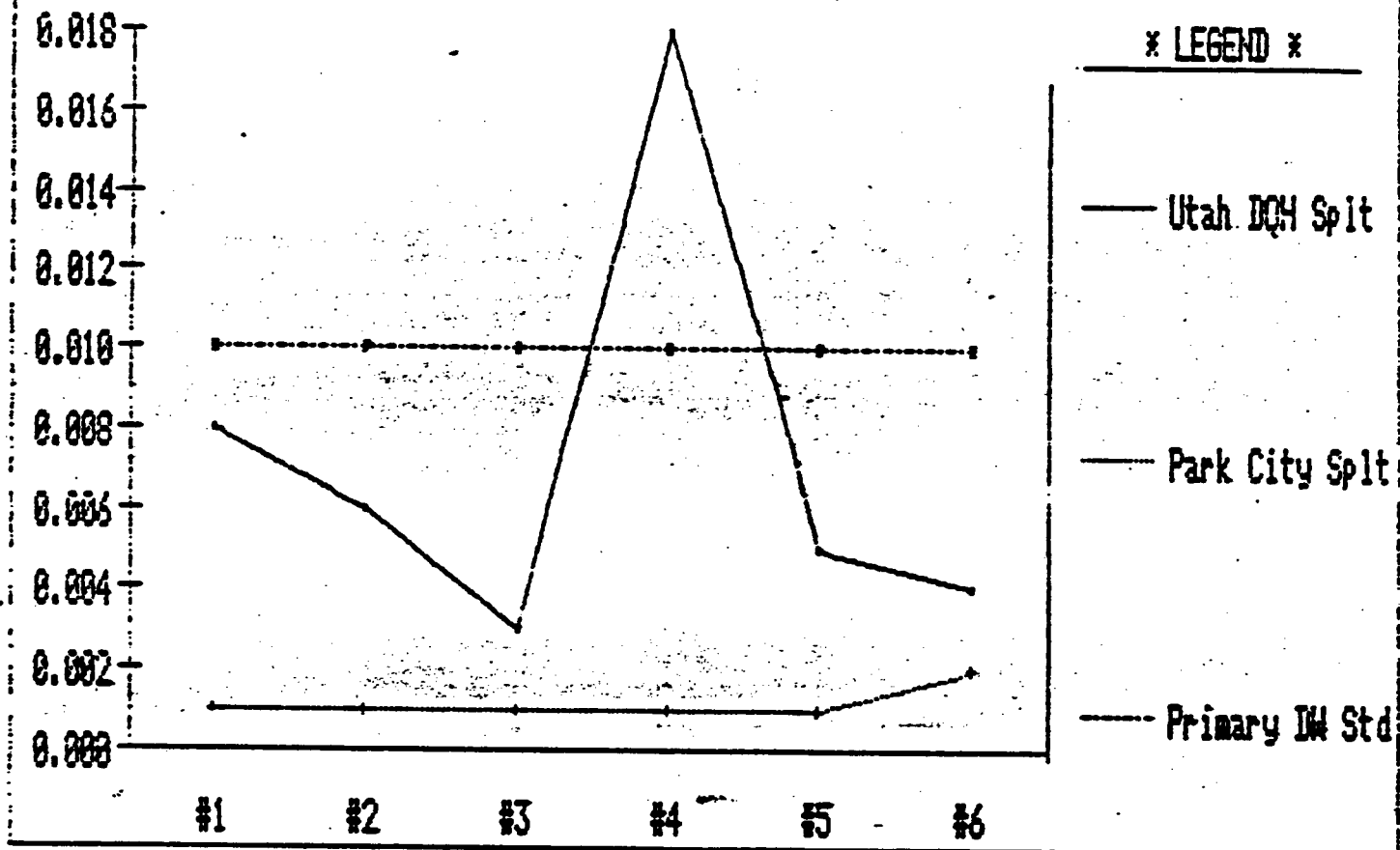
Station ID	Station Name	Date Sampled
#1	Poison Creek - Swade Alley	9-24-85
#2	Confluence Poison Creek and Deer Valley	
#3	Silver Creek below Masonic Hill	
#4	Silver Creek at RR Crossing in Prospector Square	
#5	Silver Creek North of Prospector Square at RR Crossing	
#6	Silver Creek North of Prospector Square at Wyatt Earp & Sidewind	



**WATER QUALITY DATA**

<u>Station ID</u>	<u>Station Name</u>	<u>Date Sampled</u>
#1	Poison Creek - Swede Alley	9-24-85
#2	Confluence Poison Creek and Deer Valley	
#3	Silver Creek below Masonir Hill	
#4	Silver Creek at RR Crossing in Prospector Square	
#5	Silver Creek North of Prospector Square at RR Crossing	
#6	Silver Creek North of Prospector Square at Wyatt Earp & Sidewind	

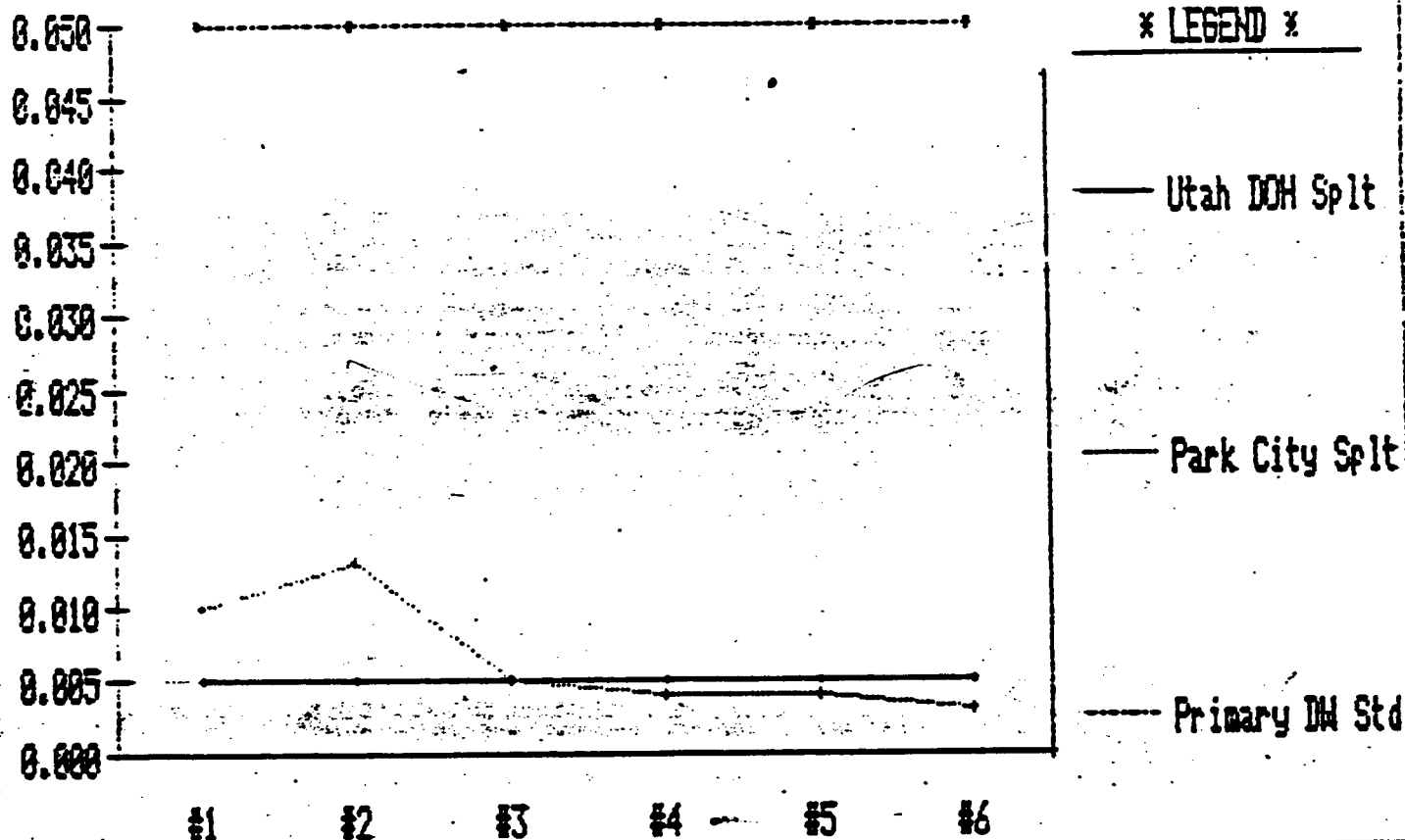
# CADMIUM TOTAL (mg/l)



## WATER QUALITY DATA

Station ID	Station Name	Date Sampled
#1	Poison Creek - Swede Alley	9-24-85
#2	Confluence Poison Creek and Deer Valley	
#3	Silver Creek below Masonic Hill	
#4	Silver Creek at RR Crossing in Prospector Square	
#5	Silver Creek North of Prospector Square at RR Crossing	
#6	Silver Creek North of Prospector Square at Wyatt Earp & Sidewind	

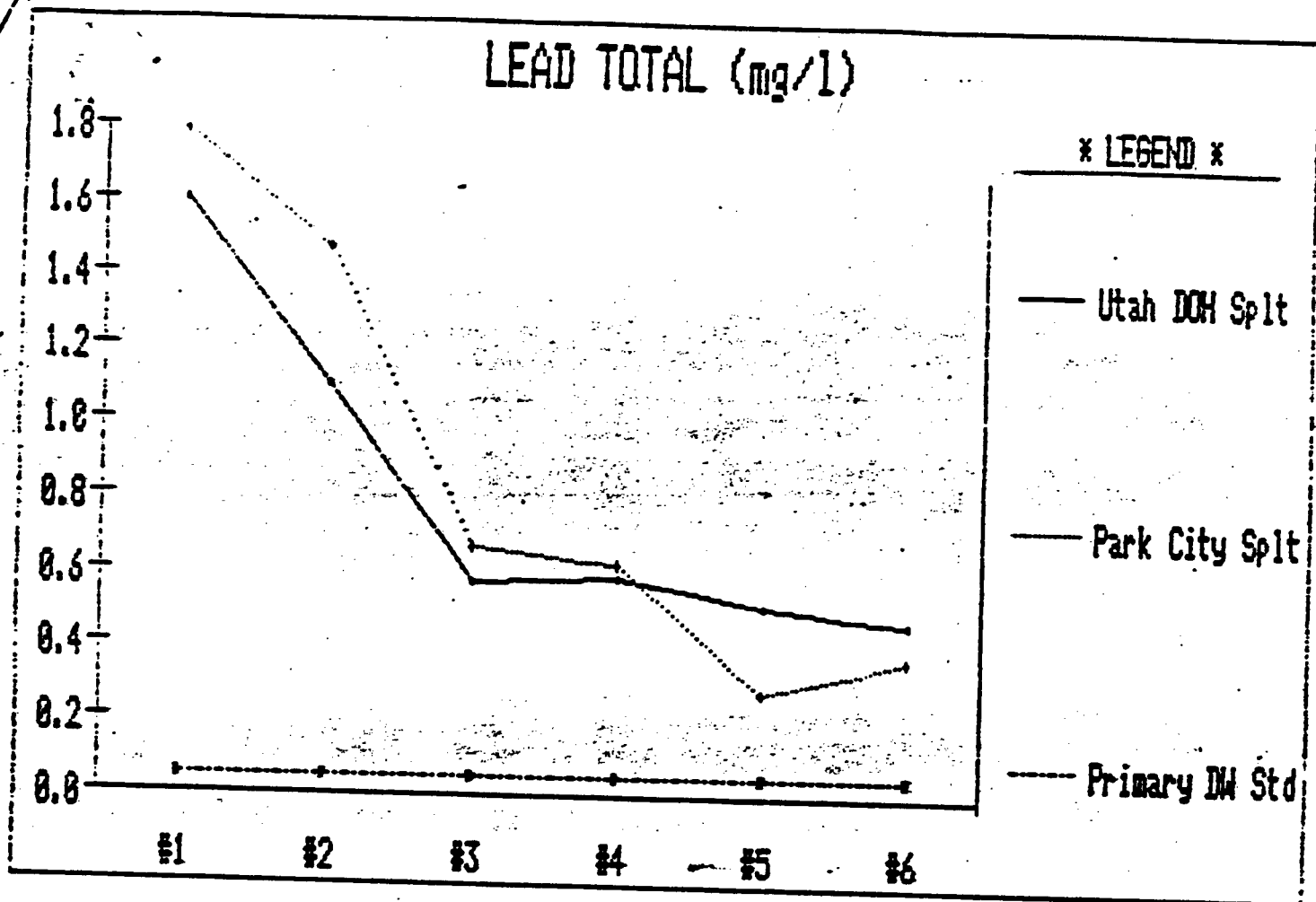
# CHROMIUM TOTAL (mg/l)



## WATER QUALITY DATA

Station ID	Station Name	Date Sampled
#1	Poison Creek - Swede Alley	9-24-85
#2	Confluence Poison Creek and Deer Valley	
#3	Silver Creek below Masonry Hill	
#4	Silver Creek at RR Crossing in Prospector Square	
#5	Silver Creek North of Prospector Square at RR Crossing	
#6	Silver Creek North of Prospector Square at Wyatt Earp & Sidewind	

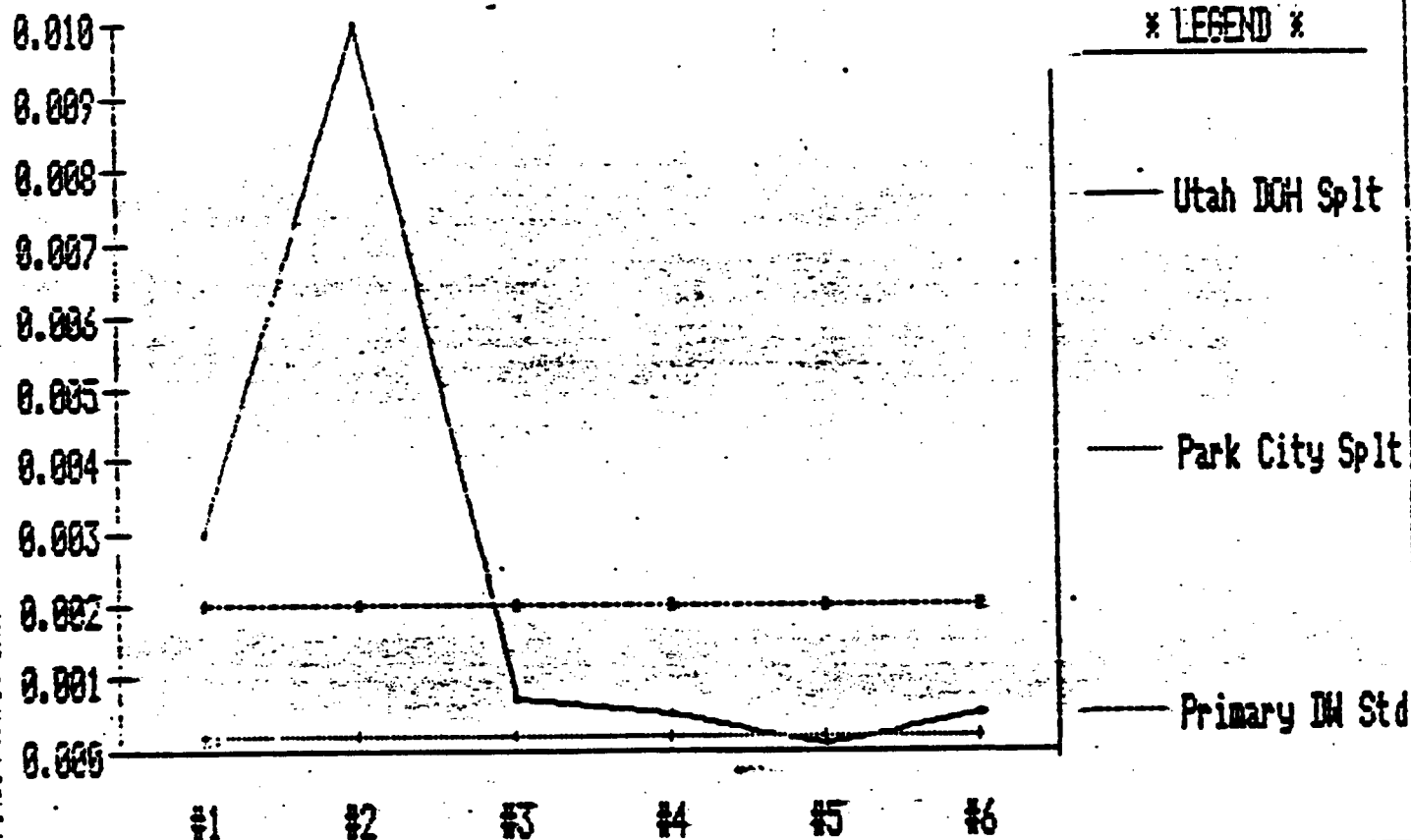
# LEAD TOTAL (mg/l)



## WATER QUALITY DATA

Station ID	Station Name	Date Sampled
#1	Poison Creek - Swede Alley	9-24-85
#2	Confluence Poison Creek and Deer Valley	
#3	Silver Creek below Masonir Hill	
#4	Silver Creek at RR Crossing in Prospector Square	
#5	Silver Creek North of Prospector Square at RR Crossing	
#6	Silver Creek North of Prospector Square at Wyatt Earp & Sidewind	

# MERCURY TOTAL (mg/l)



## WATER QUALITY DATA

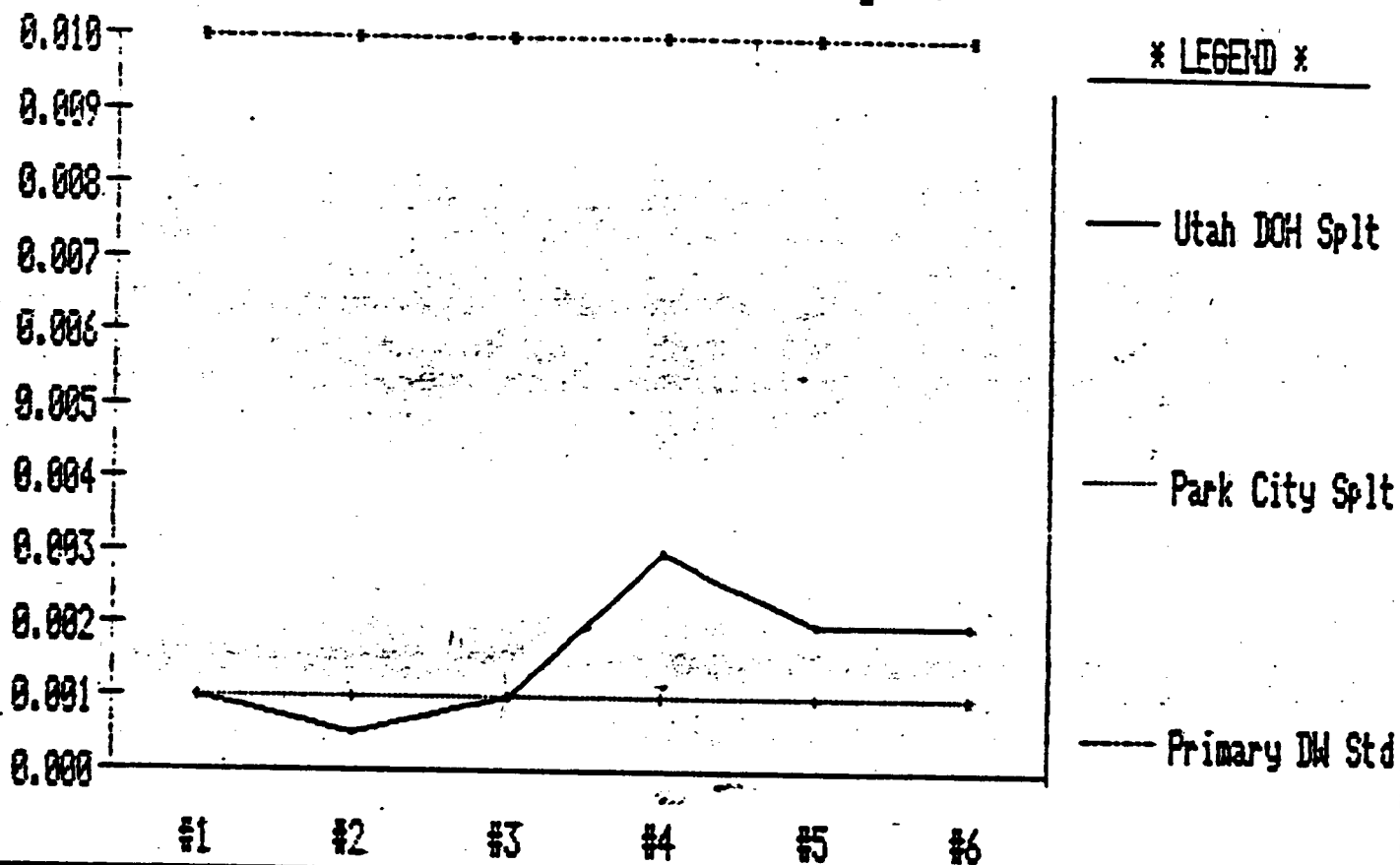
Station ID	Station Name
------------	--------------

Date Sampled
--------------

9-24-85

#1	Poison Creek - Swede Alley
#2	Confluence Poison Creek and Deer Valley
#3	Silver Creek below Masonic Hill
#4	Silver Creek at RR Crossing in Prospector Square
#5	Silver Creek North of Prospector Square at RR Crossing
#6	Silver Creek North of Prospector Square at Wyatt Earp & Sidewind

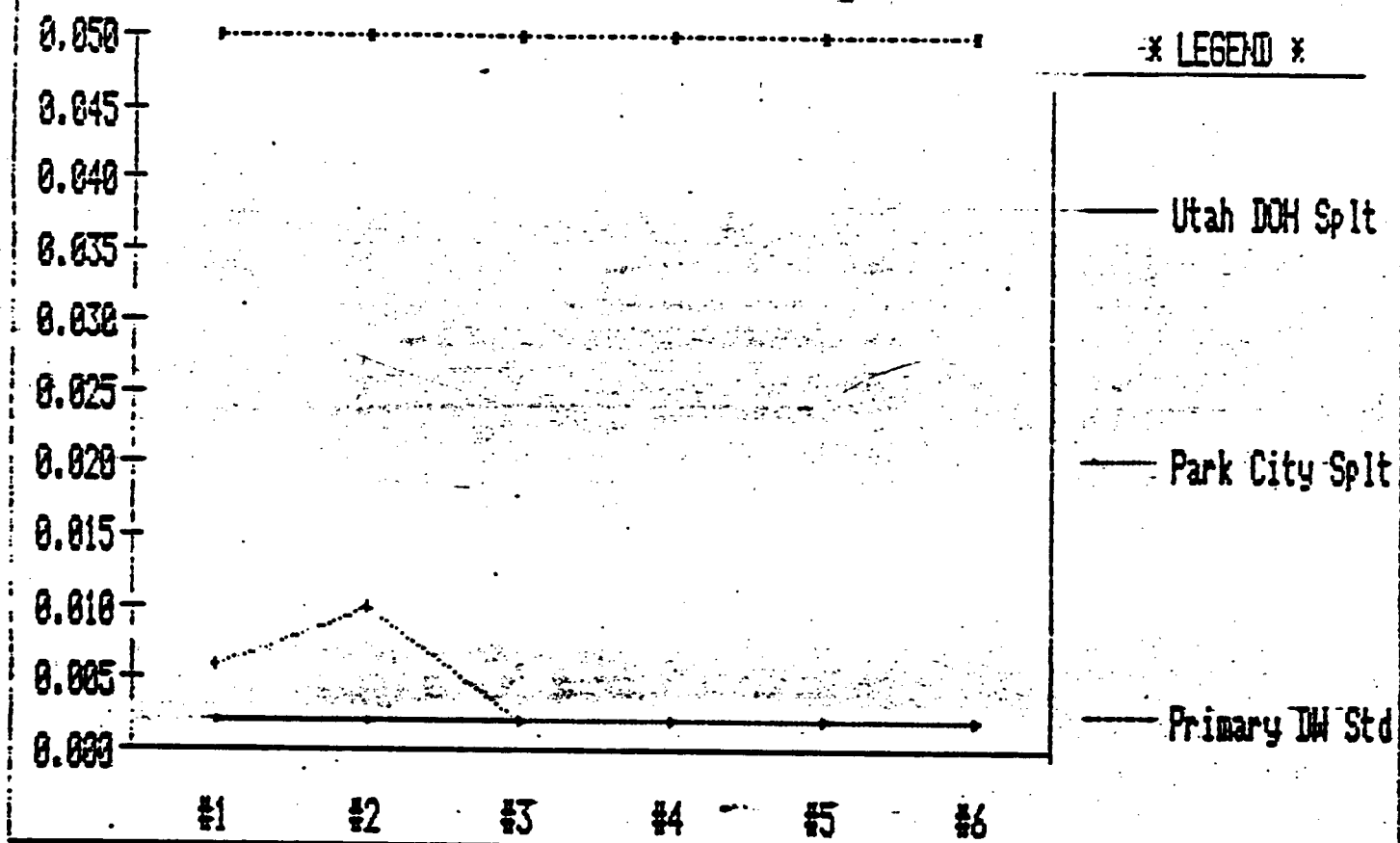
# SELENIUM TOTAL (mg/l)



## WATER QUALITY DATA

Station ID	Station Name	Date Sampled
#1	Poison Creek - Swade Alley	9-24-85
#2	Confluence Poison Creek and Deer Valley	
#3	Silver Creek below Masonir Hill	
#4	Silver Creek at RR Crossing in Prospector Square	
#5	Silver Creek North of Prospector Square at RR Crossing	
#6	Silver Creek North of Prospector Square at Wyatt Earp & Sidewind	

# SILVER TOTAL (mg/l)



## WATER QUALITY DATA

Station ID	Station Name	Date Sampled
#1	Poison Creek - Swade Alley	9-24-85
#2	Confluence Poison Creek and Deer Valley	
#3	Silver Creek below Masonic Hill	
#4	Silver Creek at RR Crossing in Prospector Square	
#5	Silver Creek North of Prospector Square at RR Crossing	
#6	Silver Creek North of Prospector Square at Wyatt Earp & Sidewind	

APPENDIX E

November 12, 1985

TELEPHONE CALL

TO: Mr. Walt Holmes

USGS

Salt Lake City, Utah

(801) 292-4662

FROM: Larry Bardwell *L.B.*

Geologist, Utah Bureau of Solid and Hazardous Waste

Salt, Lake City, Utah

(801) 533-4145

I called Mr. Walt Holmes to determine what Park Meadows pump test that he was referring to in his 7 February 1985 telephone conversation with R. Channing Johnson summarized in EPA's HRS Reference 12 (HRS package dated 1/15/85 and 2/7/85). Mr. Holmes said he was referring to the February-April '83 pump test conducted by Higginson/Barnett, the same test interpreted by J.J. Johnson Assoc. in their Park Meadows/Park City Hydrology Study, July 1983.

LB/sk

7563/4